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A COMPARATIVE STUDY OF THE YOUNGEST AND OLDEST SEVENTH-GRADE  
PUPILS ENROLLED IN THE ELEMENTARY SCHOOLS FOR  
NEGROES IN MACON, GEORGIA

A THESIS  
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## CHAPTER I

### INTRODUCTION

Statement of the Problem.-- The problem in this study was to make comparisons of mental maturity, personality, behavior problems, and academic achievement between the youngest and oldest seventh-grade pupils in the elementary schools for Negroes in Macon, Georgia for the school year 1949-50.

Definitions of Terms.-- The term "younger subjects" as used in this study refers to the fourteen boys and forty girls who were twelve years of age and younger at the time this study was conducted. The term "older subjects" refers to the thirty-eight boys and twenty-five girls in the study who were fifteen years of age and older at that time.

Mental maturity refers to the intellectual growth of the subjects as measured by the variables of the New California Short-Form Test of Mental Maturity.

The basic feelings and reactions of the subjects, which make up their personalities, are measured by the components of the California Test of Personality.

Behavior problems as they are referred to in this study are those aspects of behavior which are measured by the Stogdill Behavior Cards.

Academic achievement is the degree of success with which the subjects can perform in the educational areas as measured

by the Progressive Achievement Tests.

Purpose of the Study.-- The purpose of this study was to answer the following specific questions:

1. What was the difference, if any, in the mental maturity of the youngest seventh-grade pupils when compared with the oldest seventh-grade pupils of the elementary schools for Negroes in Macon, Georgia?

2. What was the difference, if any, in the personality development of the youngest seventh-grade pupils when compared with the oldest seventh-grade pupils of the elementary schools for Negroes in Macon, Georgia?

3. What was the difference, if any, in the behavior problems of the youngest seventh-grade pupils when compared with the oldest seventh-grade pupils of the elementary schools for Negroes in Macon, Georgia?

4. What was the difference, if any, in the academic achievement of the youngest seventh-grade pupils when compared with the oldest seventh-grade pupils of the elementary schools for Negroes in Macon, Georgia?

Method of Procedure.-- The subjects employed in this study were 117 Negro children enrolled in the seventh grade of the public elementary schools of Macon, Georgia. This number included thirty-four girls, twelve years of age and younger; twenty-five girls fifteen years of age and older, and thirty-eight boys fifteen years of age and older. In other words, the younger group was composed of fifty-four children and the older group of sixty-three.

The tests used in this study were:

1. Sullivan, E. T., Clark, W. W., and Tiegs, E. W.

The New California Short-Form Test of Mental Maturity. Los Angeles: California Test Bureau, 1947. Intermediate Form.

2. Thorpe, L. P., Clark, W. W., and Tiegs, E. W.

California Test of Personality. Los Angeles: California Test Bureau, 1942. Elementary Series.

3. Stogdill, Ralph M. Stogdill Behavior Cards. Columbus,

Ohio: Hedrick Publishing Company, 1936.

4. Tiegs, E. W., and Clark, W. W. Progressive Achieve-

ment Test. Intermediate Battery. Los Angeles: California Test Bureau, 1943.

Copies of the mental maturity, personality, and achievement tests are included in the appendices. The behavior problem instrument includes material which is too bulky to be included in the appendix.

The following is a brief outline of the steps by which the data for this study were collected:

Permission was secured from the superintendent of schools in Macon, Georgia and the Jeanes' teacher in charge to ask the cooperation of the principals and teachers of the seventh-grades in the elementary schools for Negroes. Each teacher was asked to submit to the writer the number of pupils in her class twelve years of age and under and the number of pupils fifteen years of age and over. The groups, representing all of the schools, when combined numbered two hundred seventy-eight.

When either the younger group or the older group of seventh-grade pupils numbered more than twenty a random sampling by the use of the "lottery method"<sup>1</sup> was taken of that particular group.

The Progressive Achievement Test was administered to twenty seventh-grade Negro pupils enrolled at the Ada Banks Elementary School, in Macon, Georgia on Monday, April 10, 1950, between the hours of nine-fifteen and twelve-thirty in the morning. The group was seated in the auditorium of the school, with a vacant seat between each subject and his neighbor to eliminate the possibilities of disturbances or cheating. The random sampling was done according to the table and suggestions in Lindquist. Two five minute recesses were observed.

On Tuesday morning April 11, 1950, a group of fourteen seventh-grade pupils of the G. W. Carver Elementary School was given the Progressive Achievement Test. The same procedure was used with this group as was used the day before at the Banks school. A class room was used as a testing room. The writer kept time with a clock which had a second hand.

On Wednesday morning, April 12, 1950, fourteen girls and boys of the B. S. Ingram Elementary School were given the Progressive Achievement Test in the school auditorium. The writer followed the line of procedure of the preceding days.

Monday morning, April 17, 1950, the subjects of the Ada

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<sup>1</sup>E. F. Lindquist, Statistical Analysis in Educational Research (New York, 1940), p. 25.

Banks School were given the California Test of Personality. The test was administered in the school auditorium within a period of forty-five minutes.

Tuesday morning, April 18, 1950, the group of subjects at the Carver School was administered the California Test of Personality.

The writer administered the Progressive Achievement Test to twelve seventh-grade pupils enrolled in the Unionville Elementary School on Thursday morning, April 20, 1950. The number of pupils in both age groups was too large in this school; therefore a random sampling was taken. Each pupil was given a piece of paper with a number on it. The writer had numbered the slips of paper from zero to forty-three - there being forty-three pupils in the combined groups. From the Lindquist table the writer read aloud from column three, row eleven, twelve numbers. The pupils who held the numbers called had been directed to stand. These pupils were used as subjects for that particular school. The school library was used as a testing center and the procedures were the same as those used with previously tested groups.

On Friday morning, April 21, 1950, the youngest and oldest seventh-grade pupils of the M. M. Burdell School were randomly sampled to secure a group of eighteen. The Progressive Achievement Test was administered to this group with the time and methods the same as was used in the other schools.

A random sampling was taken of the youngest and oldest

pupils in the seventh-grades of the L. H. Williams Elementary School on Monday morning, April 24, 1950. The Progressive Achievement Test was administered to a sample group of eighteen in the school auditorium by the writer.

On Tuesday morning, April 25, 1950, a sampling was taken of the youngest and oldest pupils enrolled in the seventh-grades of the Green Street School. The Progressive Achievement Test was administered to a group of eighteen subjects randomly selected.

The California Test of Personality was administered to the subjects of the L. H. Williams School and the Green Street School on the mornings of May 1, 1950 and May 4, 1950 respectively under the same conditions created and used in the other schools for the tests as described above.

The writer visited each of the seven schools twice more. The dates ranging from Wednesday morning April 26, 1950 at the L. H. Williams School to Tuesday morning, May 23, 1950 at the Carver School. On the first of these two visits the New California Short-Form Test of Mental Maturity was administered, and the Stogdill Behavior Cards were administered on the last visit. Both of these tests are short, the New California Short-Form Test of Mental Maturity can be administered in sixty minutes and the Stogdill Behavior Cards in fifteen minutes. This enabled the writer to visit one school in the morning and one in the afternoon until all seven had been visited.

A total of 117 subjects in the seven schools were given



the tests. The tests were hand scored by the writer. All of the tests were administered under very satisfactory testing conditions. The instructions for administering as given in the various manuals were followed carefully. Adequate writing space, adequate lighting, comfortable seating, and freedom from outside disturbances were provided.

Pertinent Literature.--- A review of the literature related to this study reveals that many investigators have been concerned with research concerning the relationship of chronological age to intelligence, personality development, behavior problems, and academic achievement. For review purposes the available literature can be classified under the following two headings: 1. Points of view or theories, and 2. Research studies.

Whether learning capacities increase or decrease with age, if so, at what period does the change usually occur, and at what rate do these capacities increase or decrease have been factors that motivated investigators in these areas.

All psychologists and educators recognize age as an indispensable influence on the child's ability to adjust himself, develop, and achieve in society. The degree to which these processes are influenced by age differ. Investigators have made efforts to determine which one or ones are influenced most by age.

Many students of this problem believe that the abilities and capacities for adjusting, developing, and achieving

decreases with age. Thorndike<sup>1</sup> did much research in an effort to establish this theory. After a series of varied and extensive experiments on learning and age, he found that age differences in favor of the younger group were larger in the more meaningless rote learning tests and were absent or the reverse in the more practical, useful, and meaningful functions. In most tasks the older person could compensate for any deficiency in learning capacity by greater interest and effort.

After investigations along the same lines Tyler concludes:

The use of intelligence tests with various ages has shown that age brings a decline in the total score obtained in such test, but that the degree of falling off depends to a large extent on the task involved. Scores on vocabulary tests and tests involving elementary-school subject-matter stay up throughout middle age. Scores on performance tests and tests requiring rapid adaptation to new situations decline markedly. Speed tests decline more than power tests.

Learning and memorizing are somewhat less efficient with advancing age, especially the learning of skills which require the breaking of old habits.<sup>2</sup>

There are those who believe that too many factors influence the development, adjustment, and achievement of an individual for age to be considered, without these factors, as a determiner of the pupil's abilities.

Typical of this theory proposed by some students of age-problems is the one by McGeoch:

Age, in the sense of time lived by an individual cannot in itself be a determiner of learning. When we use

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<sup>1</sup>E. L. Thorndike, Adult Learning (New York, 1928), p. 335.

<sup>2</sup>L. E. Tyler, The Psychology of Human Differences (New York, 1947), pp. 165-89.

age as an independent experimental variable, we regard it as a useful symbol for the complex conditions which age brings with it.

Data leaves little room for doubt that learning occurs from the hour of birth onward, but they do not permit systematic comparison of the rates of learning of children of different ages.

Studies show that the immediate reproduction called for in memory span performances increases slowly, but certainly, from an early age to the age of ten or twelve and somewhat more slowly to that region to chronological age of eighteen or slightly beyond.

Analogous results appear when the amount of deseparate material presented is beyond the subject's span and when measurement is in terms of whatever fraction of this amount he can recall.<sup>1</sup>

Supporting the theory that learning decreases with age is a study reported by Anastasi<sup>2</sup> which involved a group of children with limited school opportunities - about five per cent of the ordinary elementary school term - and with low home environment. There was a coefficient of  $-.76$ , for age and intelligence in favor of the younger children. As a child grew older the differences in schooling and the cultural level of the home became more apparent. A further corroborated fact brought was that the mental ages of children within a single family tended to be similar, even though their chronological ages differed.

Teagarden<sup>3</sup> studied four hundred and eight subjects between the ages of twelve and a half and twenty years of age to

<sup>1</sup>John A. McGeoch, Psychology of Human Learning (New York, 1948), p. 208.

<sup>2</sup>Anne Anastasi, Differential Psychology (New York, 1949).

<sup>3</sup>F. M. Teagarden, "A Study of the Upper Limits of the Development of Intelligence," Teacher's College Bulletin, (1924), p. 112.

determine the upper limit of the development of intelligence and found a steady decrease beginning around fifteen years of age. A range of 61 - 136 was found for the total age span. Asher<sup>1</sup> had similar findings in a study of three hundred sixty-three mountain children between the ages of seven and sixteen. There was a dropping off of IQs from 83.5 at the age of seven to 60.6 at the age of fifteen.

Cattell<sup>2</sup> assisted with investigations conducted at Harvard and Stanford Universities to determine the relationship between intelligence and chronological age. From one hundred and fifty to two thousand subjects were tested over a period of seven years. There was a definite tendency for the pupils of higher intelligence to gain in score and for those of lower intelligence to decrease in score on the intelligence tests as they grew older. The investigators found that there was a greater decrease in the intelligence of girls with age than boys.

Among the findings of investigators are some that support the theory that learning increases with age. Of these Jones and Conrad<sup>3</sup> report a steady increase of intelligence from ten

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<sup>1</sup>E. J. Asher, "Inadequacy of Current Intelligence Tests for Testing Kentucky Mountain Children," Journal of Genetic Psychology, XLVI (November, 1939), 480-86.

<sup>2</sup>Psyche Cattell, "Comparison of IQs Obtained from Different Tests at Different Age Levels," School and Society, XXXI (March 29, 1930), p. 437-42.

<sup>3</sup>H. E. Jones and H. S. Conrad, "The Growth and Decline in Intelligence," Genetic Psychology Monograph, XXIII (January, 1941), 191-234.

to twenty-one in a study of one thousand ninety-one individuals between the ages of ten and sixty for performance on the Army Alpha Test.

A study was made of sixty-one children who were tested at twenty-eight different age levels; namely, every month at first, and as the child grew older, at three months, six months and then twelve month intervals. There was an irregular mental development with age in younger children reported by Bayley, the author of the study.

Honzek, MacFarland, and Allen<sup>1</sup> made a study using several individual and group tests and found decreased correlations of intelligence with intervals of administering the tests to the two to eighteen year old subjects. Almost sixty per cent of the group changed fifteen or more points.

Curtis<sup>2</sup> tested one hundred three, nine year olds and one hundred fifteen, twelve year olds with ten tests and reported an increase of abstract or symbolic intelligence with increase in chronological age.

After studying six hundred thirty-eight subjects of various age levels to determine the relationship of chronological age and memory, Mulhall<sup>3</sup> reported that memory seems to improve with

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<sup>1</sup>M. P. Honzik, J. W. MacFarland and L. Allen, "The Stability of Mental Test Performance Between 8 and 18 Years," Journal of Experimental Education, XX (December, 1948), 309-24.

<sup>2</sup>Hazen A. Curtis, "A Study of Various Types of Intelligence," Genetic Psychology Monograph, VII (October, 1926), 21-27.

<sup>3</sup>E. F. Mulhall, "Test of Memories of School Children," Journal of Educational Psychology, VIII (May, 1917), 294-302.

with age and grade, but probably more with age.

In reporting studies of adolescent emotions and adjustments Ryall<sup>1</sup> points out that age was an important factor in the ability to make adjustments.

In a study of chronological age and its effect on human achievement, Ruch<sup>2</sup> tested three groups of different age levels and found that the older subjects were inferior to the younger subjects in learning of all types of materials, although they were less inferior on the meaningful material.

In an effort to formulate principles for reading instruction, Gates<sup>3</sup> gave much of his time to studying the relationship between chronological age and reading. He found relatively low correlations between chronological age and all school subjects except reading comprehension and reading rate.

Townsend<sup>4</sup> made a study of age and some school subjects and found high correlations between spelling, reading comprehension, vocabulary and age.

Many studies of children's language have been concerned with relationships between linguistic development and other factors

<sup>1</sup>C. J. Skinner, (ed.), Emotion and Adjustment (New York, 1948), p. 322.

<sup>2</sup>F. M. Ruch, "The Differentiative Effects of Age upon Learning," Journal of General Psychology, XI (October, 1934), 261-86.

<sup>3</sup>A. I. Gates, "The Correlation of Achievement in School-Subjects with Intelligence Tests and Other Variables," Journal of Educational Psychology, XIII (March, 1922), 129-283.

<sup>4</sup>Agatha Townsend, "An Investigation of Certain Relationships of Spelling with Reading and Academic Aptitudes," Journal of Experimental Education, XVII (December, 1948), 309-24.

such as age, sex intelligence, and socio-economic status. Brooks<sup>1</sup> found that a child had a progressively greater command of language as he grows older, and that age is usually taken as the basis for judging development. The maturation of the structure necessary for speech, the increase of motor skills, and of intelligence, all follow age in average development. With age, too, comes experience and situations for learning from which meanings develop and by which language is extended.

Studying the retention and relearning of arithmetic skills in grades seven and eight, Davis and Rood<sup>2</sup> found that there were steady gains in average scores and that problems solved correctly or missed on the second testing were largely solved correctly on the third testing. This phenomenon, they concluded reflects the importance of relearning that accompanies further study of advanced topics dependent on skills learned earlier.

Heibreder<sup>3</sup> tested subjects of various ages to determine the relationship of chronological age and problem solving. The analysis of the data revealed an increasing ability to solve problems with increased age.

This review of the literature pertinent to the present

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<sup>1</sup>Fowler D. Brooks, Child Psychology (New York, 1937), p. 200.

<sup>2</sup>R. A. Davis and E. J. Rood, "Remembering and Forgetting Arithmetic Abilities," Journal of Educational Psychology, XXXVIII (April, 1947), 216-22.

<sup>3</sup>E. F. Heibreder, "Problem Solving in Children and Adults," Journal of Genetic Psychology, XXXV (April, 1928), 522-44.

study does not include all of the published germane studies, but only those which were available and which seemed to offer useful findings or ideas.

In summary it appears from this review that both theory and study point to the importance of age as a factor in behavior. Younger persons appear to behave differently from older persons, even when both groups are selected from and compared within the same economic, social, or educational framework.



## CHAPTER II

### PRESENTATION AND INTERPRETATION OF DATA

In this chapter the data for this study are presented and analyzed. Each of the four questions stated under "Purpose of the Study" in Chapter I will be considered in the light of the data pertinent to it.

Performance of the New California Short-Form Test of Mental Maturity.--- The frequency distribution of raw scores for total mental factors obtained on the New California Short-Form Test of Mental Maturity by the younger and older seventh-grade pupils enrolled in schools for Negroes in Macon, Georgia are shown in Table 1 and Figure I. The scores obtained by the younger subjects on the total test ranged from 19 to 75, and those obtained by the older subjects ranged from 21 to 61. The highest possible score for the total mental factors is 145.

The mean raw score for the younger subjects for the total mental factors was 42.8 and the standard deviation was 10.1. When compared with the test norms the younger subjects of the study had a mean grade placement of 5.3 for total mental maturity and an IQ of 68.

The older subjects of the study obtained a mean raw score of 40.5, and a standard deviation of 10.2 for total mental maturity, as measured by the California test. These pupils had an average grade placement of 5.1, and an IQ of 66 when

TABLE 1

FREQUENCY DISTRIBUTION OF RAW SCORES FOR TOTAL MENTAL FACTORS  
OBTAINED ON THE NEW CALIFORNIA SHORT-FORM TEST OF MENTAL  
MATURITY BY FIFTY-FOUR YOUNGEST AND SIXTY-THREE OLDEST  
PUPILS ENROLLED IN SEVENTH GRADES FOR NEGROES  
IN MACON, GEORGIA

Scores	Younger Frequency	Older Frequency
75-79	1	2
70-74	0	1
65-69	1	4
60-64	1	8
55-59	2	7
50-54	5	3
45-49	15	5
40-44	11	8
35-39	8	10
30-34	8	3
25-29	0	6
20-24	1	4
15-19	1	2
	N 54	N 63
	Mean 42.8	Mean 40.5
	Sigma 10.1	Sigma 10.2
	S.E.M. 1.4	S.E.M. 1.3
	Diff. $M_1$ & $M_2$ 2.3	
	S.E. Diff. 1.9	
	"t" 1.2	

compared with the norms of the test.

Tyler, states that, according to Pintner, the literature concerning Negro intelligence agrees that scores made in intelligence tests gives the southern Negro an average IQ of 75. In the light of this information both the younger and older subjects of this study have scored lower than the average usually recorded for Negroes in the literature.

The difference between the obtained means of the raw

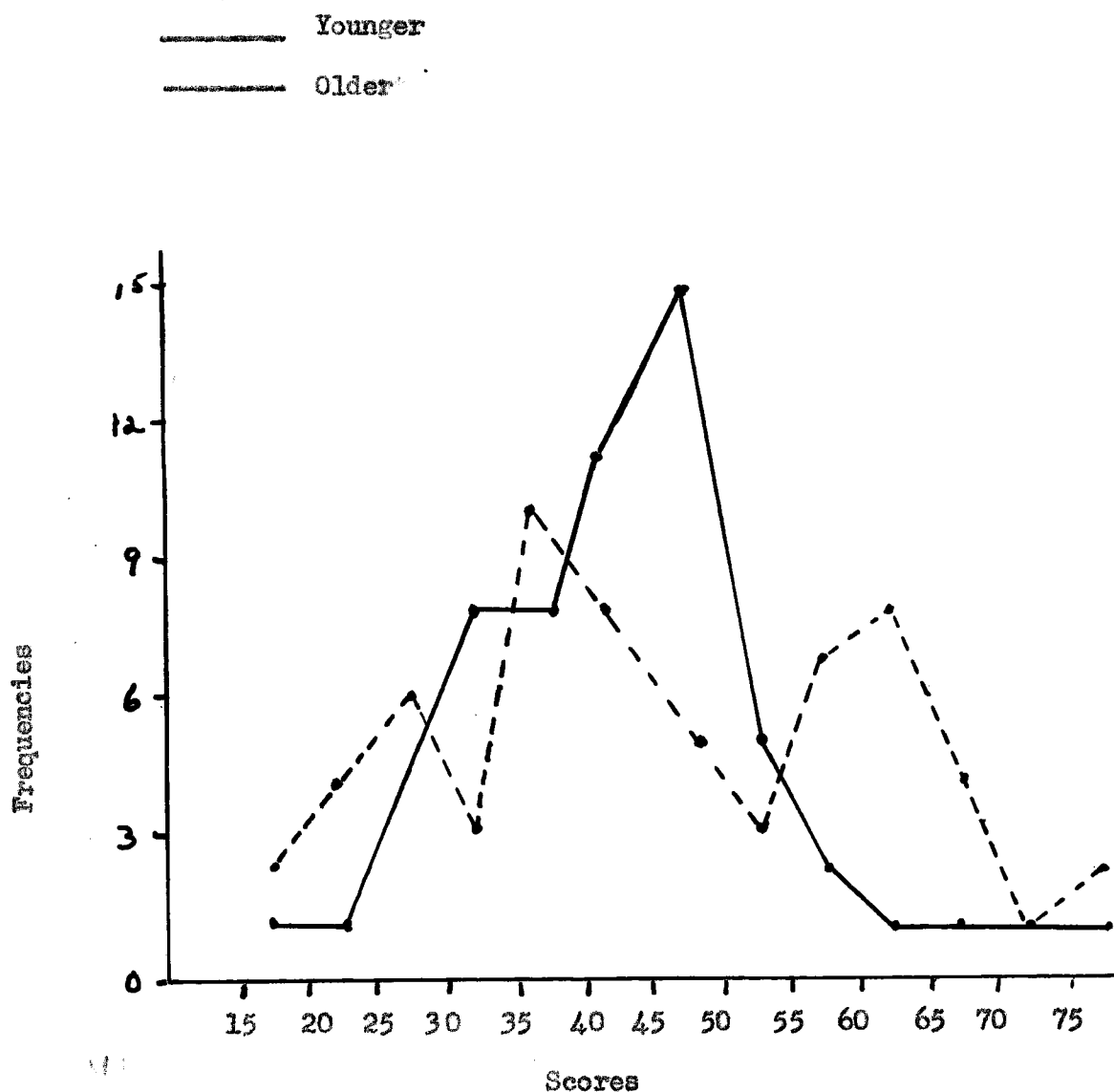


Fig. 1.— Frequency polygon of raw scores for total mental factors obtained on the New California Short-Form Test of Mental Maturity by fifty-four youngest and sixty-three oldest seventh grade pupils of the study

scores for the younger and older subjects was found to be 2.3 for the total test. The computed "t" for this difference with 115 degrees of freedom was 1.2, which is not significant according to Fisher's "t" table.

The frequency distribution of raw scores obtained by the two groups of subjects on the language factor of the mental test are shown in Table 2, and Figure 2. The mean score

TABLE 2

FREQUENCY DISTRIBUTION OF RAW SCORES OBTAINED ON THE LANGUAGE FACTORS OF THE NEW CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY BY FIFTY-FOUR YOUNGEST AND SIXTY-THREE OLDEST NEGRO PUPILS ENROLLED IN SEVENTH-GRADES

Scores	Younger Frequency	Older Frequency
45-47	1	0
42-44	0	0
39-41	1	0
36-38	1	1
33-35	1	0
30-32	0	4
27-29	2	8
24-26	5	10
21-23	14	9
18-20	10	11
15-17	8	10
12-14	6	0
9-11	5	4
6- 8	0	4
3- 5	0	2
	N : 54 Mean : 17.9 Sigma : 0.9	N : 63 Mean : 18.3 Sigma : 0.8
Diff. $M_1$ & $M_2$ : 0.4 S.E. Diff. : 1.2 "t" : 0.3		

obtained by the younger subjects for language factors of the

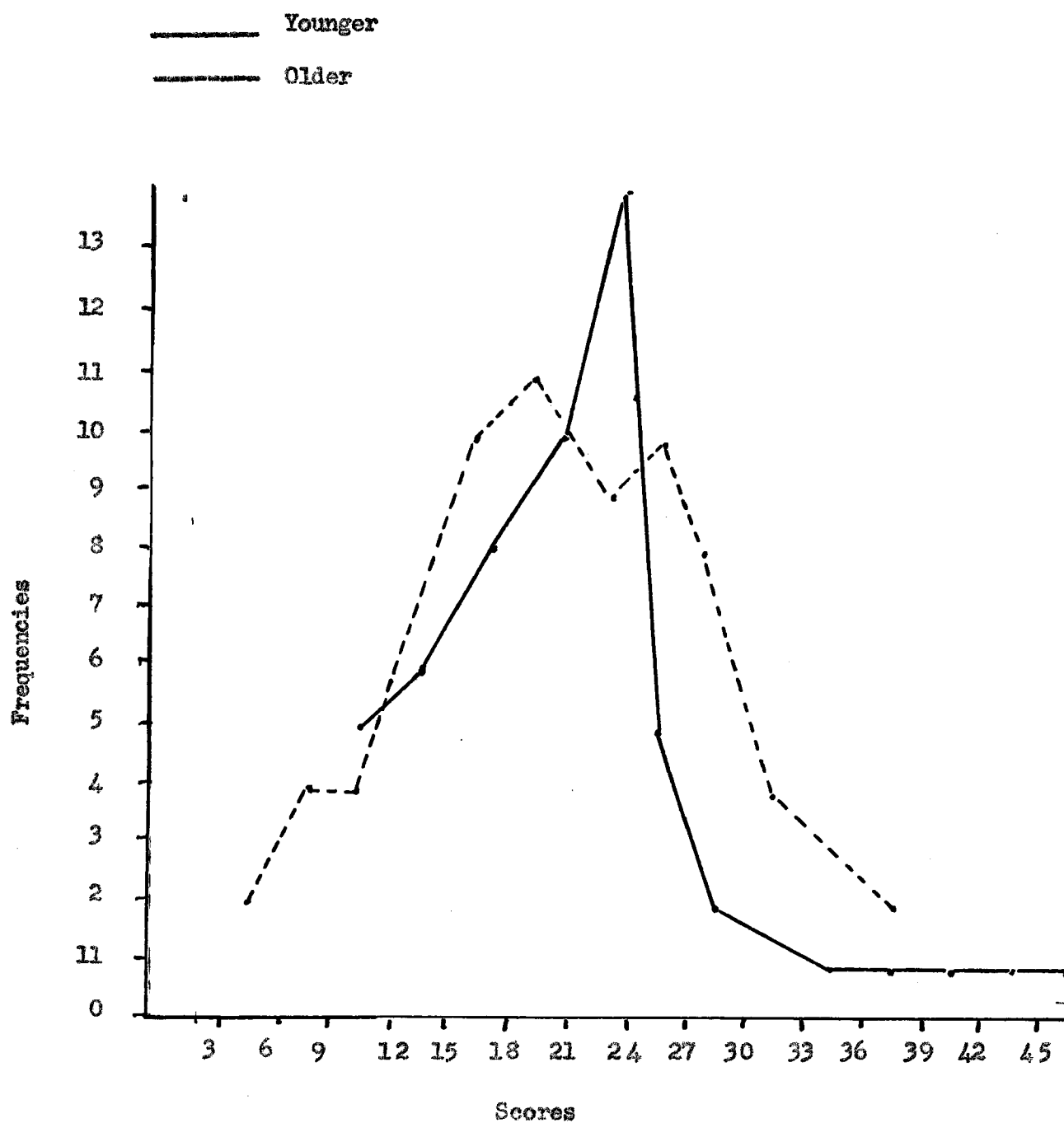


Fig. 2.- Frequency polygon of raw scores for language factors obtained on the New California Short-Form Test of Mental Maturity by fifty-four youngest and sixty-three oldest seventh grade pupils of the study

(L)

mental test is 17.9, and the standard deviation is 6.5. The scores obtained by the younger subjects for this part of the test ranged from 9 to 45. When the obtained mean was compared with the test norms the younger subjects of the study were found to have an average grade placement of 4.8 on the language factors and an average IQ of 63. This indicates that the younger subjects were retarded almost three years and possessed an average IQ of sixteen points below the norm IQ for pupils of the same age and grade level.

The raw scores obtained by the older subjects on the language factors of the mental test ranged from 5 to 36. According to the data in Table 2, the mean was 18.3 for language factors, as measured by the instrument used, and the average IQ for the group was 65. These findings might lead one to believe that the older seventh-grade pupils were more mentally mature than the younger ones of the study, but, further analysis of the data reveals that the value of "t" is 0.3. With 115 degrees of freedom this obtained difference would be considered as statistically unreliable.

Table 3 and Figure 3, presents the data concerning the performance of the subjects of the study on the non-language factors of the New California Short-Form Test of Mental Maturity. The scores obtained by the younger subjects ranged from 10 to 34. The mean for the younger group was 21.6, and the standard deviation was 5.1. A comparison of these scores with the norms for the test indicates that the younger group of subjects were retarded 2.4 years and that they had an average IQ much below

TABLE 3

FREQUENCY DISTRIBUTION OF RAW SCORES OBTAINED ON THE NON-LANGUAGE FACTORS OF THE NEW CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY BY FIFTY-FOUR YOUNGEST AND SIXTY-THREE OLDEST PUPILS ENROLLED IN SEVENTH GRADES FOR NEGROES IN MACON, GEORGIA

Scores	Younger Frequency	Older Frequency
39-41	0	2
36-38	0	0
33-35	1	6
30-32	2	15
27-29	6	6
24-26	14	14
21-23	12	7
18-20	11	5
15-17	4	2
12-14	1	4
9-11	3	2
	N = 54 Mean = 21.6 Sigma = 5.1 S.E.M. = 0.7	N = 63 Mean = 25.2 Sigma = 6.8 S.E.M. = 0.9
Diff. $M_1$ & $M_2$ = 3.6 S. E. Diff. = 1.1 "t" = 3.3		

the so-called normal. Their grade placement and IQ, were 5.3 and 68, respectively according to the norms for the average score obtained by this group.

The range for scores obtained by the older subjects on the non-language factors of the mental test was from 9 to 38. The mean score for the group was 25.2, and the standard deviation was 6.8. When compared with the test norms the older subjects had a grade placement of 6.3 and an IQ of 74, which indicates that the older subjects of the study were retarded 1.4 years

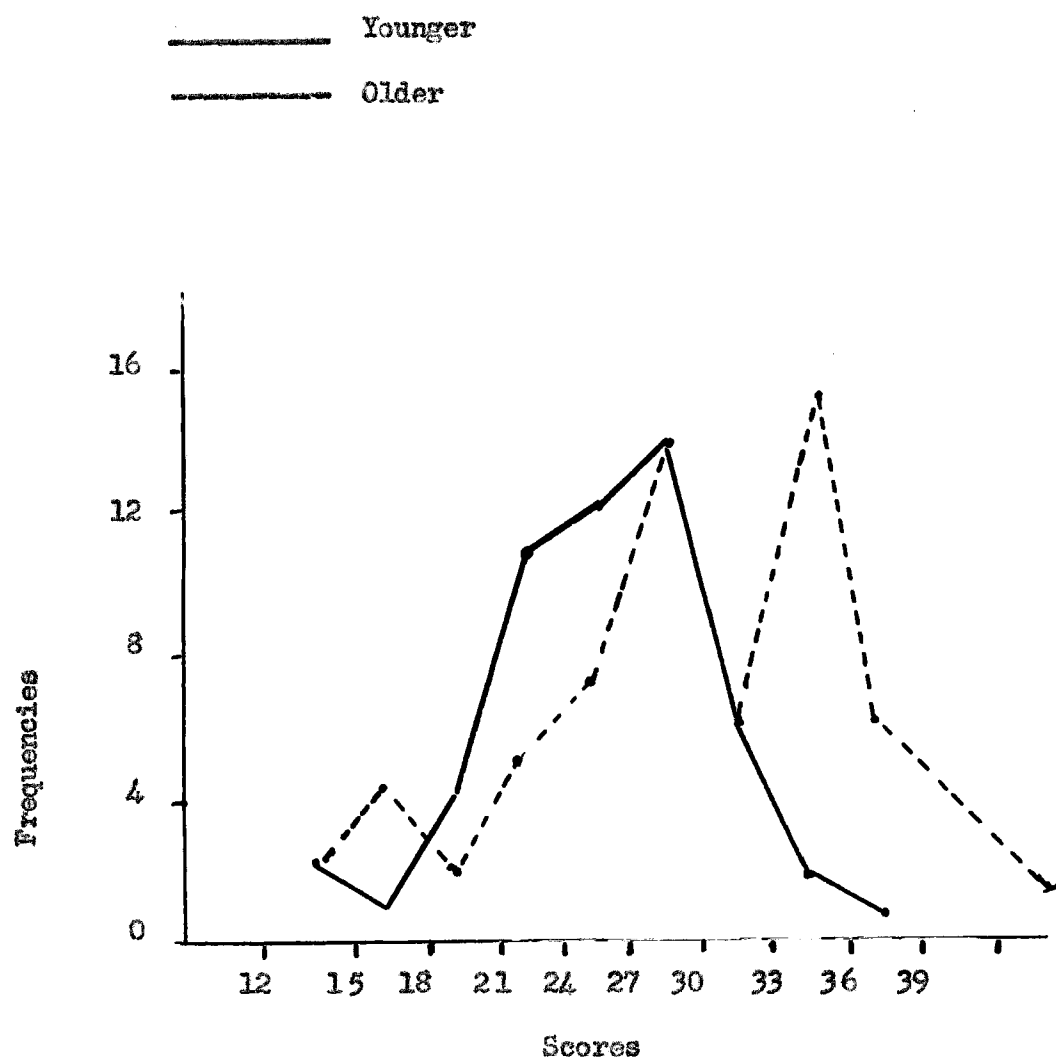


Fig. 3.—Frequency polygon of raw scores for non-language factors obtained on the New California Short-Form Test of Mental Maturity by fifty-four youngest and sixty-three oldest seventh grade pupils



and had IQs two points below the average IQ for Negroes as reported in the reference from Tyler mentioned earlier in the chapter.

The value of "t", 3.3, with 115 degrees of freedom gives statistical reliability to the findings beyond the one per cent level of confidence. This difference, of course, suggests the older group scored significantly higher than the younger one.

The analysis of the data shows no statistical difference in the total mental factors of the younger and older pupils enrolled in the seventh grades for Negroes in Macon, Georgia. This is also true for the language component of the test; however, the older subjects test significantly higher than the younger ones on the non-language part of the test.

The findings on the test of mental ability are not what one would expect from logical reasoning or from reviewing the literature; however, these results may have been influenced by uncontrolled factors such as those which may be included under socio-economic status and other such items. At least the findings for this part of the study are interesting and provide the basis for certain suggestions which will be mentioned later.

#### Performance on the California Test of Personality.--

Table 4 and Figure 4 show the total distribution of raw scores obtained, by the youngest and oldest pupils in the seventh-grades of the Negro schools of Macon, Georgia, for the California Test of Personality.

TABLE 4

FREQUENCY DISTRIBUTION OF RAW SCORES OBTAINED ON THE CALIFORNIA  
TEST OF PERSONALITY BY FIFTY-FOUR YOUNGER AND SIXTY-THREE  
OLDEST PUPILS ENROLLED IN SEVENTH GRADES  
IN MACON, GEORGIA

Scores	Younger Frequency	Older Frequency
135-139	2	1
130-134	4	2
125-129	7	4
120-124	9	10
115-119	8	7
110-114	5	8
105-109	2	7
100-104	6	8
95- 99	4	4
90- 94	3	4
85- 89	1	2
80- 84	2	1
75- 79	1	0
70- 74	0	1
65- 69	0	2
60- 64	0	1
55- 59	0	1
	N = 54 Mean = 112.5 Sigma = 13.6 S.E.M. = 1.9	N = 63 Mean = 112.9 Sigma = 21.5 S.E.M. = 2.7
Diff. $M_1$ & $M_2$ = 0.4 S.E. Diff. = 3.3 "t" = 0.2		

The raw scores obtained by the younger subjects ranged from 79 to 136. The mean raw score was 112.5, and the standard deviation was 13.6. According to the norms of the test, this means that the younger subjects of this study scored at the 55th percentile. The highest score obtained in this group was 135 against a possible score of 144 for the total test. One

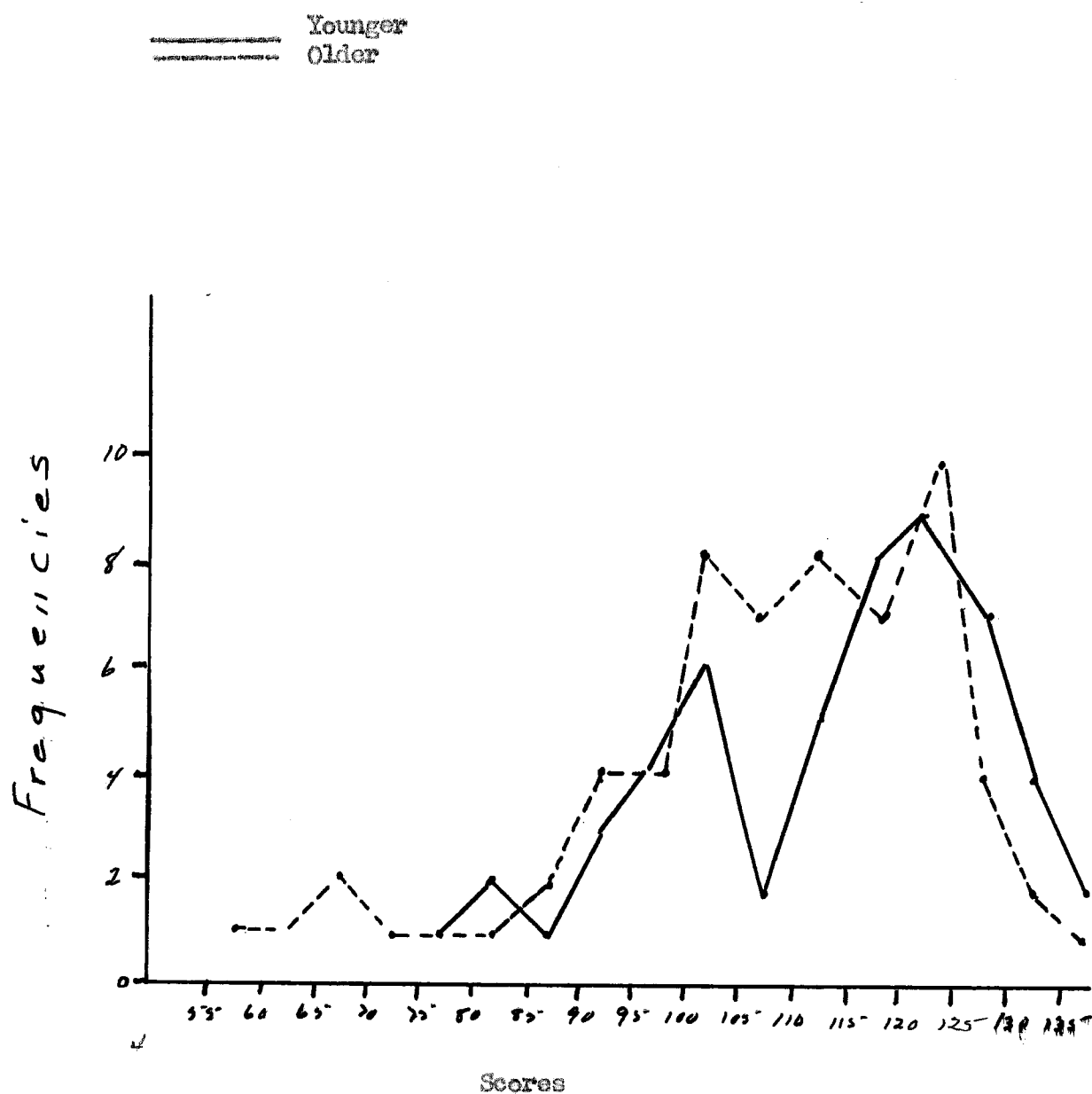


Fig.4 - Frequency polygon of raw scores obtained on total California Test of Personality by fifty-four youngest and sixty-three oldest seventh grade pupils

subject, a boy, obtained the highest raw score, which indicates that this subject scored at the 90th percentile. The lowest score, 79, was made by a girl. The test norms would place her at the 20th percentile.

The raw scores obtained by the older subjects on the total test for personality had a wider range. The lowest being 58 and the highest 139. These were the scores of a boy and a girl respectively. This may be considered to mean that the older group scored from the 5th percentile to the 95th percentile. The average raw score for this group was 112.9. This was a little higher than the average for the younger subjects.

The value of " $t$ ", 0.2, was too small to be considered significant in an attempt to determine the reliability of the difference between the two means for the total personality test.

The California Test of Personality is composed of two major parts - the self-adjustment tests and the social adjustment tests. Each of these two aspects of the test may be considered by summing the raw scores made on the six sub-tests for the particular part.

As to self-adjustment, it may be seen in Table 5 and Figure 5 that the younger subjects made raw scores ranging from 33 to 66. The highest possible score was 72. This range may be compared with scores by the older group which ranged from 26 to 63.

The mean raw score for the Self-Adjustment sub-test made by the younger subjects was 52.9 which may be considered as

TABLE 5

FREQUENCY DISTRIBUTION OF RAW SCORES OBTAINED ON THE SELF  
ADJUSTMENT FACTORS OF THE CALIFORNIA TEST OF PERSONALITY  
BY FIFTY-FOUR YOUNGEST AND SIXTY-THREE OLDEST  
PUPILS ENROLLED IN SEVENTH GRADES FOR  
NEGROES IN MACON, GEORGIA

Scores	Younger Frequency	Older Frequency
65-67	2	0
62-64	5	3
59-61	12	10
56-58	6	5
53-55	2	11
50-52	10	11
47-49	9	4
44-46	3	4
41-43	2	10
38-40	1	1
35-37	1	1
32-34	1	1
29-31	0	1
26-28	0	1
	N = 54 Mean = 52.9 Sigma = 7.5 S.E.M. = 1.0	N = 63 Mean = 50.1 Sigma = 6.8 S.E.M. = 0.9
Diff. $M_1$ & $M_2$ = 2.8 S.E. Diff. = 1.3 "t" = 2.1		

equivalent to the 50th percentile. The mean raw score of the older subjects was just 2.8 points lower, 50.1, which may also be represented by the 50th percentile. Although no difference exist between the percentile ranks, there seems to be a difference between the means of the raw scores which was significant between the 5 and the 1 per cent level of confidence. In other words there seems to be some statistical basis for believing that the younger subjects were better adjusted with respect to

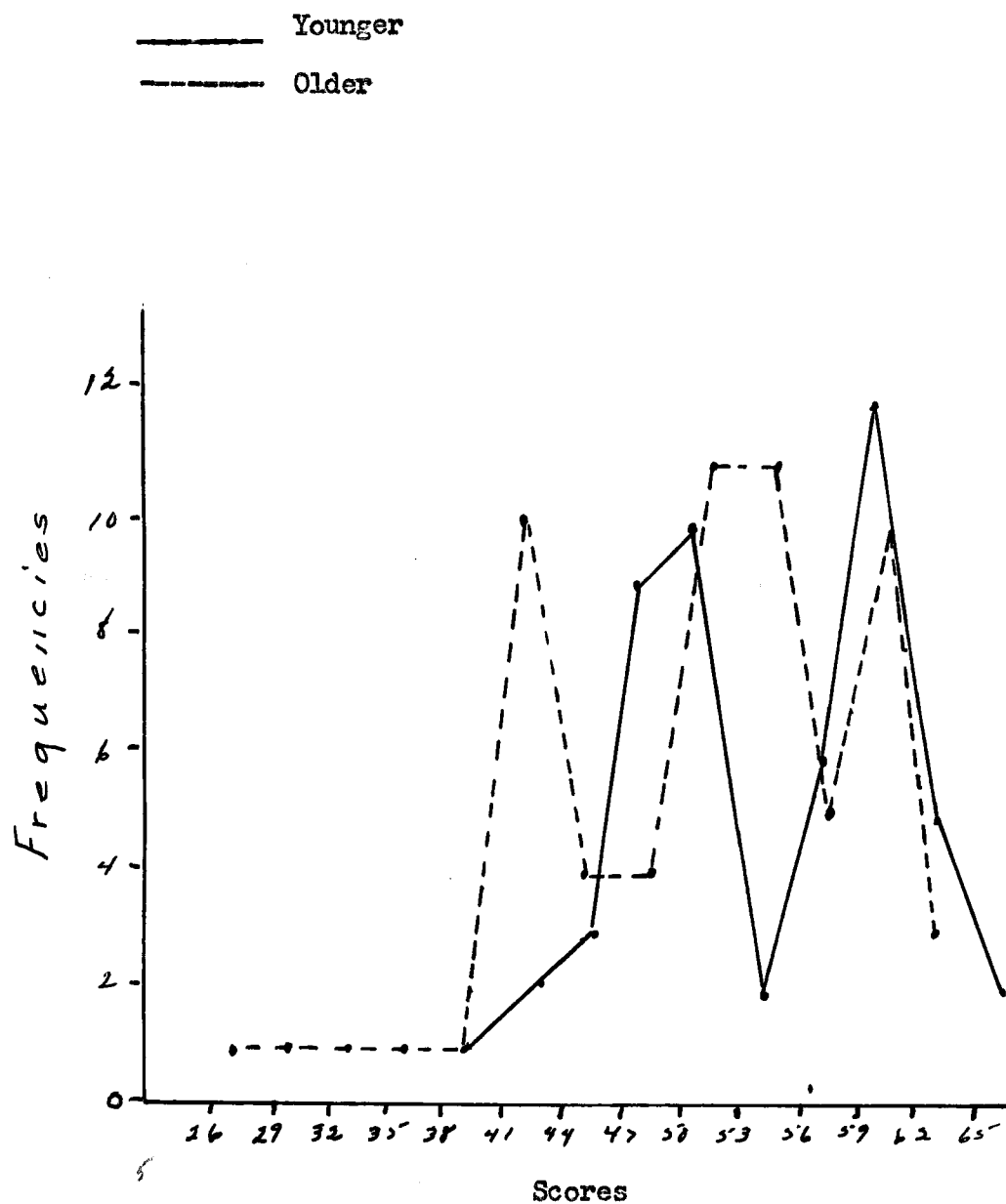


Fig. 5.- Frequency polygon of raw scores obtained on the self adjustment factors of the California Test of Personality by fifty-four youngest and sixty-three oldest seventh grade pupils

whatever is measured by the self-adjustment component of the personality inventory than were the older subjects.

The range of scores obtained by the subjects for the Self-Reliance variable of the personality test was from 5 to 11 for the younger group and from 2 to 12 for the older group. Both groups scored at the 70th percentile when compared with the test norms. The mean raw score was 8.4 for the younger group and 8.0 for the older subjects.

The obtained difference, 0.4, was found to be insignificant when "t" was computed, with the 115 degrees of freedom.

The range of scores obtained by the younger subjects for sense of Personal Worth was from 6 to 12. The average raw score for the group was 9.5, which indicated that the subjects scored below 35 per cent of the standardizing group, when compared with the norms of the test.

The older subjects obtained raw scores ranging from 4 to 12 for the sense of personal worth component of the test. The mean raw score was 10.2 and this may be considered as meaning that this group scored at the 80th percentile on this factor.

The obtained difference between the average raw scores for the two groups was 0.7. This was not a significant difference according to the "t" test that has been employed in the study.

The scores obtained by the younger subjects for the Sense of Personal Freedom factor of the personality test ranged from 5 to 12. The mean score was 9.8. When the average score was compared with the test norms, the younger subjects scored at the 30th percentile.

The older subjects made raw scores that ranged from 4 to 12 for Sense of Personal Freedom. The mean raw score, 8.9, indicated, when compared with the test norms, that this group scored at the 20th percentile, or below 80 per cent of the standardizing group.

The value of "t" was found to be .12, with 115 degrees of freedom, therefore, the difference found between average raw scores was not significant for this variable.

The younger subjects scored from 7 to 12 on the Feeling of Belonging sub-test of the California Test of Personality. They obtained an average raw score of 11.0, which indicated, when compared with the test norms, that the group scored at the 65th percentile, or below 35 per cent of the standardizing population.

The raw scores obtained by the older subjects for this factor ranged from 4 to 12. According to the test norms, the obtained mean score, 10.3, indicated that the older subjects scored at the 40th percentile, or below 60 per cent of the subjects used to establish the test norms.

The obtained difference, 0.7, between the two means was not significant because the value of "t", .17, was too small.

The younger subjects obtained raw scores ranging from 1 to 12 for the Withdrawing Tendencies component of the personality test. The mean score was 7.7, and indicated that 60 per cent of the norm population scored above the younger subjects of this study.

The raw scores obtained by the older subjects for



Withdrawing Tendencies ranged from 0 to 12. The group received an average raw score of 7.1, which, when compared with the test norms indicated that the subjects in this group scored at the 40th percentile.

There was a difference of 0.6 between the two means, but it was not significant since the value of "t" was too small.

The range of raw scores obtained by the younger subjects on the Nervous Symptoms of the personality test was from 3 to 12. When the mean, 8.2, was compared with the test norms it was revealed that the younger subjects scored at the 30th percentile or below 70 per cent of the subjects for the tests norms.

The older subjects of the study obtained raw scores ranging from 0 to 12 on the Nervous Symptoms factor of the test. The average raw score, 7.8, for the group indicated that they scored at the 20th percentile when compared with the test norms.

In an attempt to determine the reliability of the obtained difference between the mean scores of the younger and older subjects for the Nervous Symptoms factor, "t" was computed and found to be .14, which was too small to be significant.

When the subjects were compared with the standardizing group the older subjects received the highest percentile rating for an average raw score of 10.2 (Table 6) on the sense of personal worth factor of the test. This score indicated that the subject scored at the 80th percentile on the test norms. The lowest average score was obtained by the older group on the

nervous symptoms component of the test. According to the norms for the test, the older subjects scored at the 20th percentile on this factor.

Table 6 shows data obtained by the younger and older subjects on the total Social Adjustment components of the California Test of Personality.

TABLE 6

FREQUENCY DISTRIBUTION OF RAW SCORES OBTAINED ON THE SOCIAL ADJUSTMENT FACTORS OF THE CALIFORNIA TEST OF PERSONALITY BY FIFTY-FOUR YOUNGEST AND SIXTY-THREE OLDEST PUPILS ENROLLED IN SEVENTH-GRADES FOR NEGROES IN MACON, GEORGIA

Scores	Younger Frequency	Older Frequency
69-71	2	3
66-68	9	6
63-65	13	10
60-62	7	10
57-59	3	8
54-56	3	7
51-53	6	5
48-50	5	2
45-47	2	4
42-44	3	0
39-41	1	3
36-38	0	0
33-35	0	2
30-32	0	1
27-29	0	2
	N = 54 Mean : 59.0 Sigma : 10.2 S.E.M. : 1.4	N = 63 Mean : 55.8 Sigma : 11.0 S.E.M. : 1.4
Diff. $M_1$ & $M_2$ : 3.2 S.E. Diff. : 2.0 "t" : 1.6		

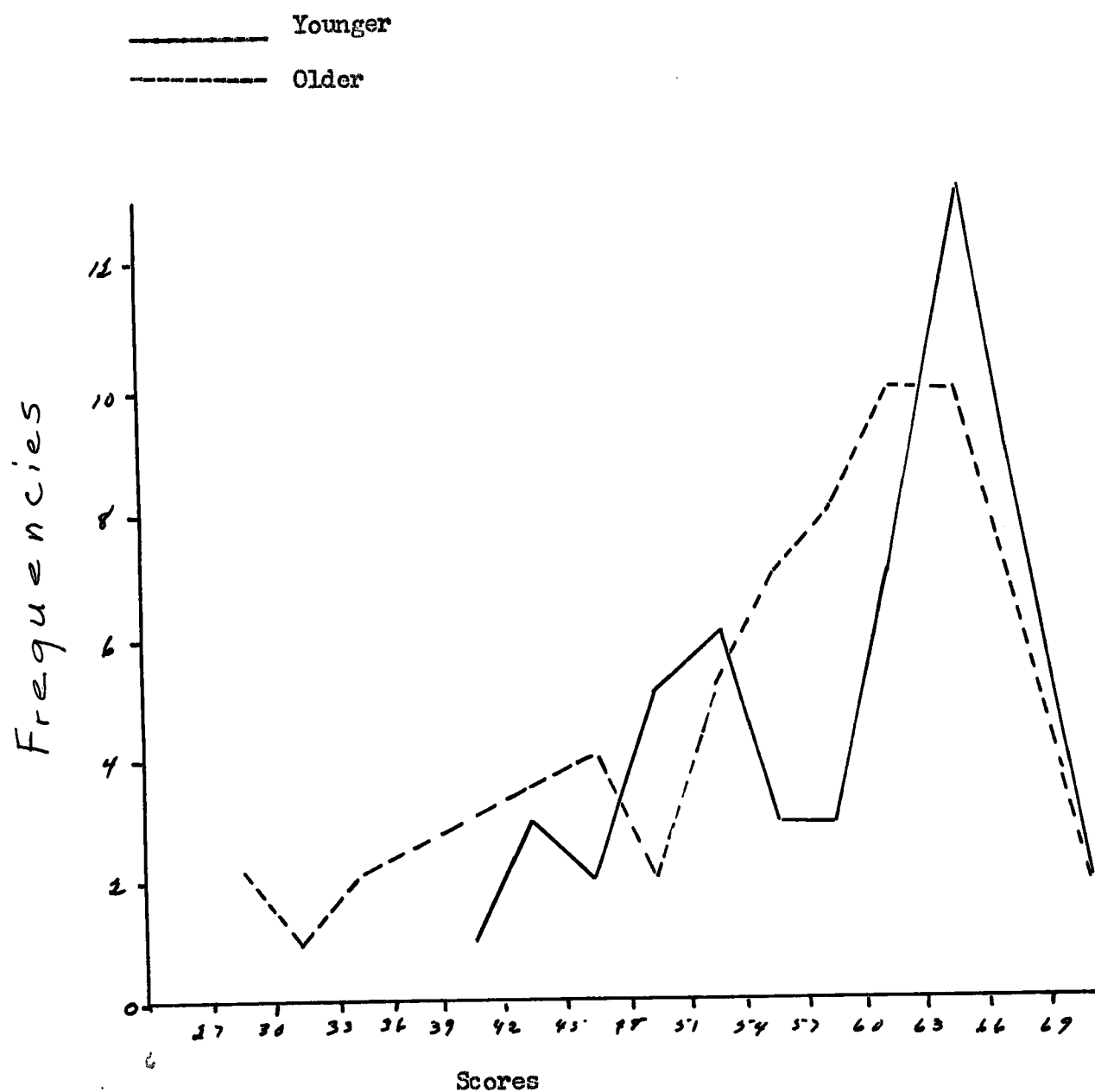


Fig. 6.- Frequency polygon of raw scores obtained on the social adjustment factors of the California Test of Personality by fifty-four youngest and sixty-three oldest pupils enrolled in seventh grade for Negroes in Macon, Georgia

The range of raw scores for the younger subjects was from 40 to 71. This group had a derived mean raw score of 59.0, and the standard deviation was 10.2 for this aspect of the personality test. When compared with the norms for the test, the derived scores indicated that the younger subjects of the study scored at the 50th percentile; or, 50 per cent of the standardizing group scored above the younger pupils of the study.

For this same group of tests the older subjects obtained raw scores ranging from 28 to 71. Their average score was 55.8, and the standard deviation was 11.0. This indicated that the older subjects scored at the 40th percentile when compared with the norms for the social adjustment factors.

The difference between the mean of the younger subjects and the mean of the older subjects on the Social Adjustment area of the personality test was 3.2, but the value of "t", 1.6, revealed that the difference was not significant.

A range of scores from 4 to 12 was obtained by the younger subjects of the study on the social standards factor of the California Test of Personality. The average raw score for the group, 10.0, indicated that the younger subjects scored at the 35th percentile when compared with the test norms.

The scores for the older subjects on the Social Standards components ranged from 4 to 12, also, but the derived mean for this group was 9.3, and indicated that this group scored at the 20th percentile when compared with the test norms.

The difference that appeared to exist between the two groups

on social standards was found to be insignificant after further analysis of the data revealed a "t" value of .18 with 115 degrees of freedom.

The younger and older subjects obtained scores ranging from 6 to 12 on the Social Skills factor of the California Test of Personality. The derived means for the younger and older groups were 9.8, and 9.6 respectively. Which indicated that both groups scored at the 45th percentile when compared with the test norms. The very low value of "t", 0.1, with 115 degrees of freedom revealed that the findings were insignificant.

The raw scores obtained by the younger subjects on the Anti-Social Tendencies factor of the test ranged from 2 to 12. This group scored at the 30th percentile when their derived mean score, 9.4, was compared with the test norms.

The older subjects scored at the 30th percentile when their mean, 9.8 was compared with the test norms. The scores obtained by this group for anti-social tendencies ranged from 1 to 12.

The difference between the means of the two groups was statistically insignificant, because the value of "t" with 115 degrees of freedom was only .1.

The range of the scores for both the younger and older subjects of the study on the family relation component of the personality test was the same: 0 to 12, but the derived means were difference.

The mean 10.4 obtained by the younger subjects indicated that they scored at the 40th percentile on Family Relations when compared with the norms of the test.

The older subjects obtained an average raw score of 9.7, which indicated that they scored at the 25th percentile when compared with the norms.

The difference of .7, which appears in the analysis of the data is not significant, as the value of "t", .11, with 115 degrees of freedom is too small.

The younger subjects obtained raw scores ranging from 0 to 12 on the School Relations factor of the California Test of Personality. The derived raw score for this group was 9.5, which indicated that the younger subjects scored at the 35th percentile, or below 65 per cent of the subjects used for the norm of the test.

The range of raw scores obtained by the older subjects was from 3 to 12 on the School Relations factor. When the mean score, 8.8 received by the group was compared with the test norms, the older subjects scored at the 20th percentile on school relations component of the personality test.

There was a difference of .7 between the mean of the younger and the mean of the older subjects on this factor of the California Test of Personality, but the low value of "t", .14, with 115 degrees of freedom reveals no statistical significance to the findings.

The range of the scores obtained on the Community Relations factor of the test was from 0 to 12 for both the younger and the older subjects of the study.

The average raw score for the younger subjects was 10.8, and indicated that when compared with the norms for the

personality test, the younger pupils of this study scored at the 35th percentile for community relations.

The older subjects scored at the 35th percentile, when compared with the norms set up for the test. They had a mean of .8 smaller than the mean for the younger group, but the value of "t", .11, with the 115 degrees of freedom revealed no significant difference for the groups.

The younger subjects of the study scored higher on the Social Adjustment factors of the personality tests than the older subjects. The highest percentile score was obtained by the younger subjects on the Family Relations component of the test. Here they scored at the 40th percentile. The older subjects scored lowest of the two groups. They scored at the 20th percentile on the school relations factor.

The younger subjects scored highest of the two groups on Self Adjustment and social adjustment, except for sense of personal worth, when the older subjects scored .7 higher than the younger subjects, but this was not significant.

Performance on the Stogdill Behavior Cards. Data obtained by administering the Stogdill Behavior Cards to the youngest and oldest seventh-grade pupils in schools for Negroes in Macon, Georgia is shown in Table 7 and Figure 7.

The range of score obtained by the younger subjects on this test was from 5 to 39. The derived mean was 17.8, and the standard deviation was 8.0.

The range of scores obtained by the older pupils was 6 to 45 on the behavior test. This group obtained a higher mean

score, 21<sup>4</sup>, than the younger subjects. The standard deviation was 9.6.

TABLE 7

FREQUENCY DISTRIBUTION OF RAW SCORES OBTAINED ON THE STOGDILL BEHAVIOR CARDS BY FIFTY-FOUR YOUNGEST AND SIXTY-THREE OLDEST PUPILS ENROLLED IN SEVENTH-GRADES FOR NEGROES IN MACON, GEORGIA

Scores	Younger Frequency	Older Frequency
45-47	0	1
42-44	0	1
39-41	1	3
36-38	1	2
33-35	0	5
30-32	3	2
27-29	4	5
24-26	4	1
21-23	9	11
18-20	5	10
15-17	7	6
12-14	7	6
9-11	8	8
6-8	4	2
3-5	1	0
	N = 54 Mean = 17.8 Sigma = 8.0 S.E.M. = 1.1	N = 63 Mean = 21.4 Sigma = 9.6 S.E.M. = 1.2
Diff. $M_1$ & $M_2$ = 3.6 S.E. Diff. = 1.6 "t" = 2.2		

The manual recommends the lowest scores on the Stogdill Behavior Cards as evidence of more acceptable behavior patterns.

It appears from observing the data, that the younger subjects have fewer behavior problems than the older subjects, but further analysis of the data reveals that the value of "t" was



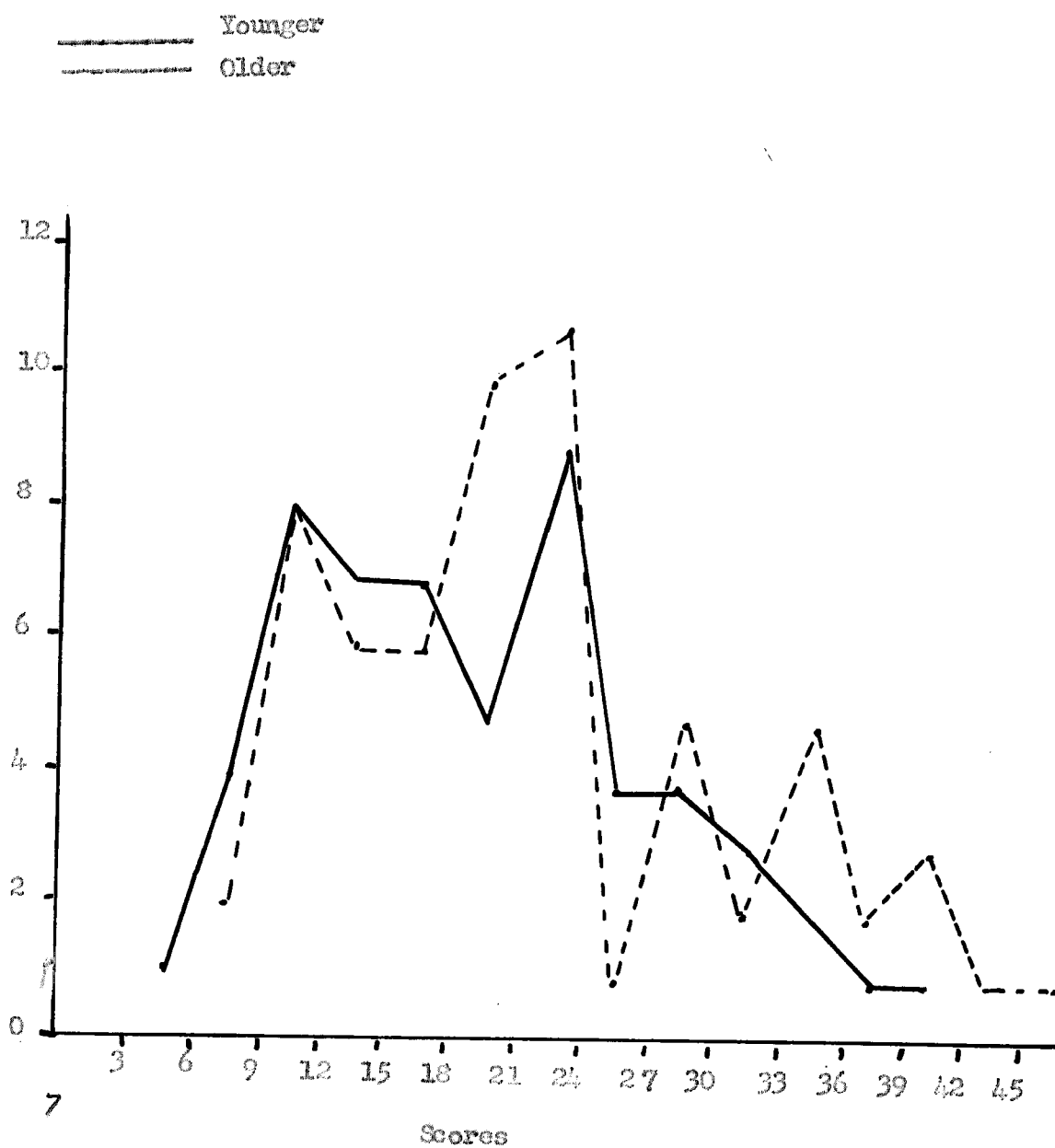


Fig.-7.- Frequency polygon of raw scores obtained on the Stogdill Behavior cards by fifty-four youngest and sixty-three oldest seventh grade pupils

2.2, which indicates significant at the 5 per cent level of confidence with 115 degrees of freedom, when it was fitted to Fisher's table.

Performance on the Progressive Achievement Test.-- Table 8 and Figure 8 show the frequency distribution of raw scores obtained by the younger and older subjects on the Progressive Achievement Test.

TABLE 8

FREQUENCY DISTRIBUTION OF RAW SCORES OBTAINED ON THE TOTAL PROGRESSIVE ACHIEVEMENT TEST BY FIFTY-FOUR YOUNGEST AND SIXTY-THREE OLDEST PUPILS ENROLLED IN SEVENTH-GRADES FOR NEGROES IN MACON, GEORGIA

Scores	Younger Frequency	Older Frequency
265-279	1	0
250-264	0	0
235-249	0	0
220-234	0	0
205-219	0	0
190-204	2	0
175-189	1	0
160-174	5	0
145-159	3	2
130-144	5	2
115-129	3	10
100-114	15	7
85- 99	8	17
70- 84	7	16
55- 69	4	8
40- 54	0	1
	N : 54 Mean : 117.0 Sigma : 39.9 S.E.M. : 5.5	N : 63 Mean : 90.0 Sigma : 21.2 S.E.M. : 2.7
Diff. $M_1$ & $M_2$ : 26.1 S.E. Diff. : 6.1 "t" : 4.3		

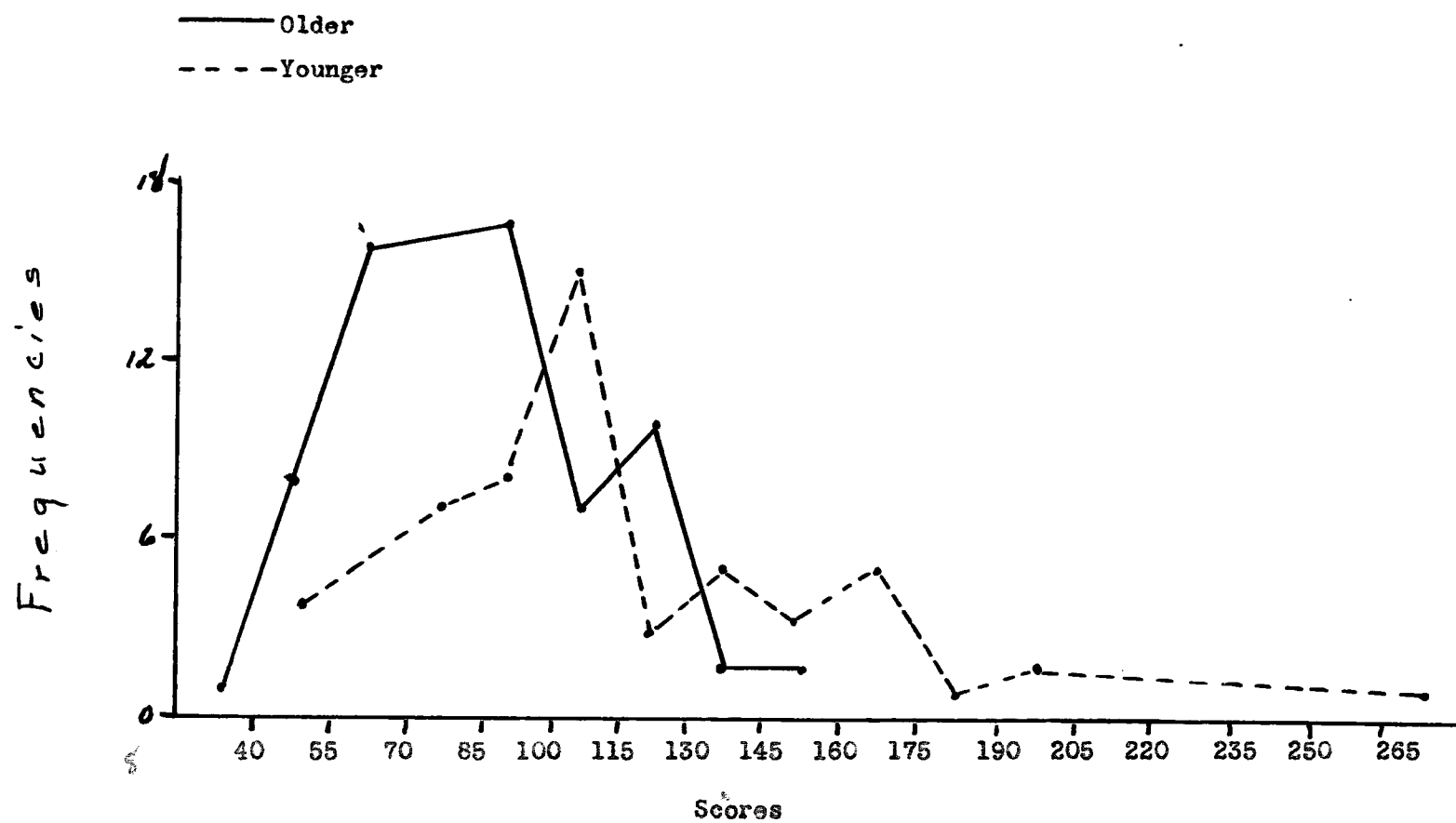


Fig. 8.- Frequency polygon of raw scores obtained on the total Progressive Achievement Test by fifty-four youngest and sixty-three oldest students enrolled in seventh grades for Negroes in Macon, Georgia

The mean raw score for the younger subjects was 117, and the standard deviation was 39.9. According to the test norms for the seventh-grade this score indicates a grade placement of 5.2 for these subjects. The obtained scores ranged from 58 to 266. The highest possible score on the test is 390.

The mean raw score for total achievement for the older subjects was 90.9 and the standard deviation was 21.2. When this score was compared with the test norms, the older group of the study had an average grade placement of 4.7. The scores for this group on achievement ranged from 44 to 149.

The difference between the means of the two groups is 26.1 with the younger group scoring higher. In order to determine the significant of this difference, "t" was computed and the ratio fitted to Fisher's table for "t". For 115 degrees of freedom at the one level of confidence, "t" must be 2.63. The value of the obtained "t" was greater than 2.63, therefore the difference, in total achievement, in favor of the younger pupils is very significant, which means that with a sampling this size, of the total population, we can expect greater divergence from the true mean less than once in one hundred trials.

The data for the younger and older subjects on the reading factors of the Progressive Achievement Test are presented in Table 9 and Figure 9. The raw scores obtained by the younger subjects ranged from 20 to 118 and for the older subjects from 14 to 72. The highest possible score for these factors was 145.

The younger subjects obtained an average raw score of 48.6,

TABLE 9

FREQUENCY DISTRIBUTION OF RAW SCORES OBTAINED ON THE READING  
FACTORS OF THE PROGRESSIVE ACHIEVEMENT TEST BY  
FIFTY-FOUR YOUNGEST AND SIXTY-THREE OLDEST  
SEVENTH-GRADE PUPILS IN SCHOOLS FOR  
NEGROES IN MACON, GEORGIA

Scores	Younger Frequency	Older Frequency
110-119	1	0
100-109	0	0
90- 99	0	0
80- 89	3	0
70- 79	3	1
60- 69	7	3
50- 59	7	8
40-49	16	17
30- 39	10	23
20- 29	7	11
	N = 54 Mean = 48.6 Sigma = 17.8 S.E.M. = 2.5	N = 63 Mean = 36.7 Sigma = 11.3 S.E.M. = 1.4
Diff. $M_1$ & $M_2$ = 11.9 S.E. Diff. = 2.9 "t" = 4.1		

and a standard deviation of 17.8. When compared with the test norms the younger subjects had an average grade placement of 5.3 for reading.

The mean score for the older subjects on the reading factors of the test was 36.7 and the standard deviation was 11.3, this indicates that the older subjects had a mean grade placement of 4.8 when compared with the test norms.

There was a difference of 11.9 in the mean raw score obtained by the younger subjects and the mean obtained by the

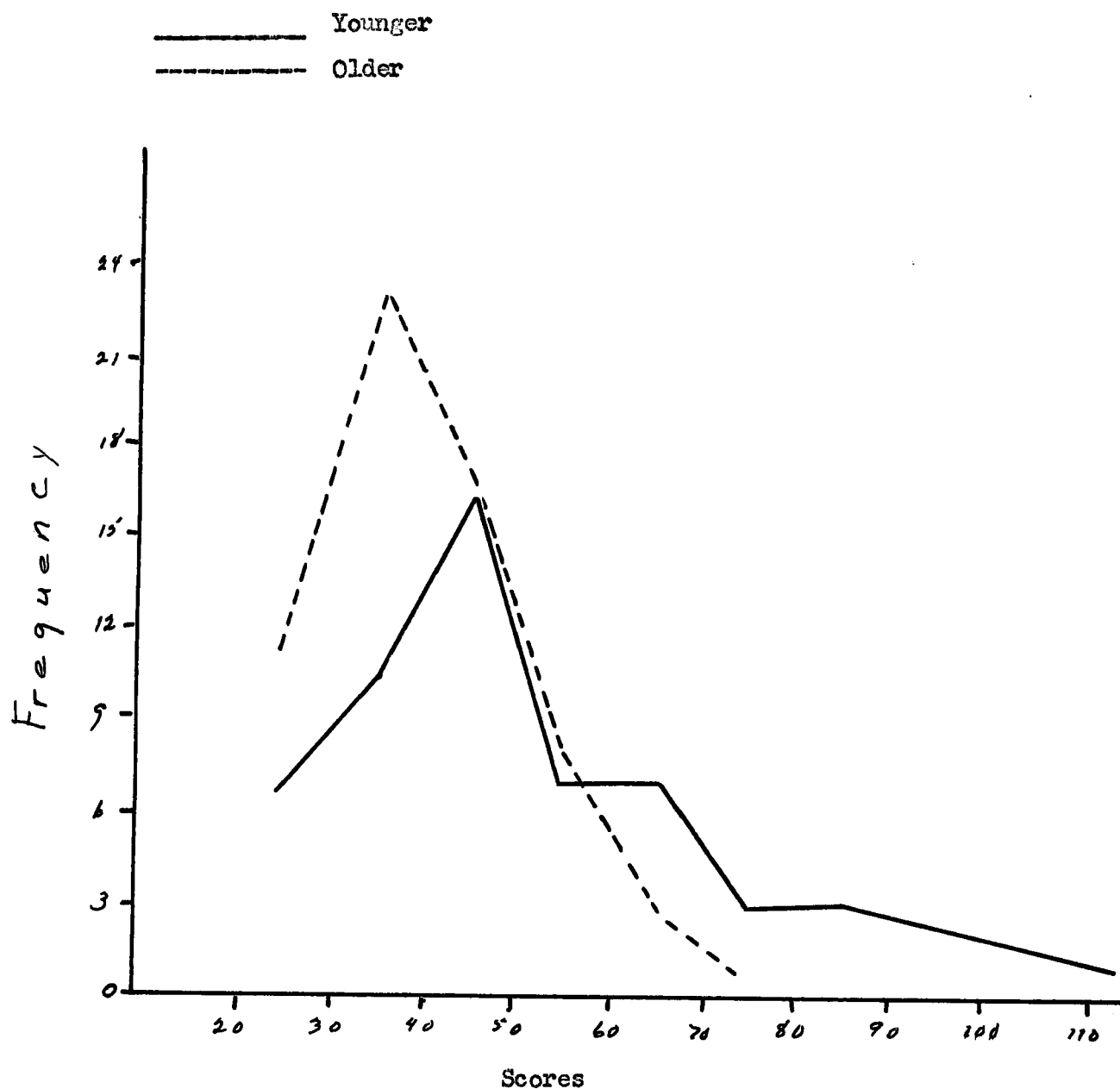


Fig.9.- Frequency polygon of raw scores obtained on the reading factors of the Progressive Achievement Test by fifty-four youngest and sixty-three oldest seventh grade pupils

older subjects for the reading factors of the achievement test, with the younger subjects scoring higher. The computed "t", 4.1, with 115 degrees of freedom justified the significant of the obtained difference at the one level of confidence.

The results of the analysis of the data obtained by the two groups of the study on the arithmetic tests of the Progressive Achievement Test are shown in Table 10, and Figure 10.

TABLE 10

FREQUENCY DISTRIBUTION OF RAW SCORES OBTAINED ON THE ARITHMETIC FACTORS OF THE PROGRESSIVE ACHIEVEMENT TEST BY FIFTY-FOUR YOUNGEST AND SIXTY-THREE OLDEST SEVENTH-GRADE PUPILS IN SCHOOLS FOR NEGROES IN MACON, GEORGIA

Scores	Younger Frequency	Older Frequency
75-79	1	0
70-74	0	0
65-69	0	0
60-64	0	0
55-59	1	0
50-54	3	1
45-49	4	1
40-44	5	2
35-39	6	4
30-34	9	5
25-29	9	10
20-24	7	17
15-19	7	15
10-14	1	8
5-9	1	0
	N = 54 Mean = 32.0 Sigma = 12.8 S.E.M. = 1.7	N = 63 Mean = 23.2 Sigma = 8.8 S.E.M. = 1.1
Diff. $M_1$ & $M_2$ = 8.8 S.E. Diff. = 2.0 "t" = 4.4		

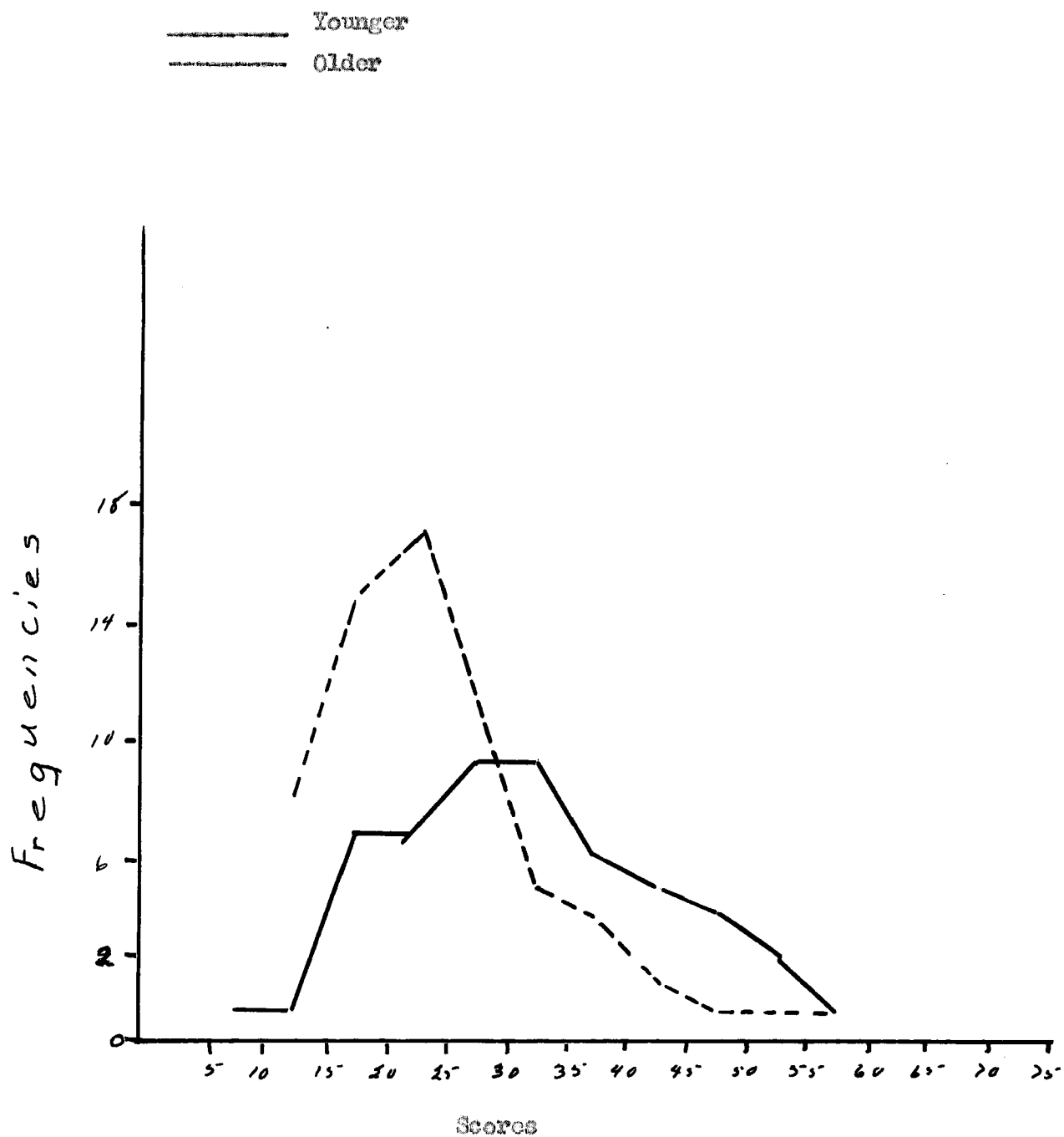


Fig. 10- Frequency polygon of raw scores obtained on the arithmetic factors of the Progressive Achievement Test by fifty-four youngest and fifty-three older pupils



The raw mean score for the younger pupils on the arithmetic test was 32.0, the standard deviation was 12.8, which indicates that the younger subjects had an average grade placement of 5.3, when compared with the test norms. The scores obtained by this group ranged from 9 to 77.

The raw scores obtained by the older subjects on the arithmetic tests of the Progressive Achievement Test ranged from 10 to 50. This group had an average raw score of 23.2, and a standard deviation of 8.8 for this area of the test.

This indicated that they had an average grade placement of 4.9 when compared with the norms for the test. Table 10 and Figure 10 show this comparison.

The difference between the two mean scores was 8.8, with a standard error of 2.0. When the value of "t", 4.4, was fitted to Fisher's Table, it revealed that the difference was statistically significant beyond the .01 level of confidence.

The raw scores obtained on the language factors of the Progressive Achievement Test by the younger and older subjects are shown in Table 11 and Figure 11.

The scores ranged from 7 to 99 for the younger subjects and from 3 to 64 for the older subjects. The highest possible score on the language factors of the test is 110. The mean score for the younger subjects was 38.8, and the standard deviation was 20.5. The average grade placement for the group was 5.0, according to the test norms.

The mean raw score for the older subjects on the language factors of the Progressive Achievement Test was 29.8, and the

TABLE 11

FREQUENCY DISTRIBUTION OF RAW SCORES OBTAINED ON THE LANGUAGE FACTORS OF THE PROGRESSIVE ACHIEVEMENT TEST BY FIFTY-FOUR YOUNGEST AND SIXTY-THREE OLDEST SEVENTH-GRADE PUPILS ENROLLED IN SCHOOLS FOR NEGROES IN MACON, GEORGIA

Scores	Younger Frequency	Older Frequency
95-99	1	0
90-94	1	0
85-89	0	0
80-84	0	0
75-79	0	0
70-74	0	0
65-69	4	0
60-64	0	2
55-59	5	1
50-54	5	2
45-49	2	2
40-44	3	6
35-39	6	11
30-34	7	9
25-29	6	9
20-24	6	8
15-19	3	7
10-14	4	1
5-9	1	4
0-4	0	1
	N = 54 Mean = 38.8 Sigma = 20.5 S.E.M. = 2.8	N = 63 Mean = 29.8 Sigma = 13.1 S.E.M. = 1.7
Diff. $M_1$ & $M_2$ = 9.0 S.E. Diff. = 3.3 "t" = 2.8		

standard deviation was 31.1. The mean grade placement for the group was 4.3 when compared with the test norms.

The difference between the mean raw scores of the two groups of seventh-grade pupils was 9.0. The analysis of the computed "t" indicated that the findings were statistically significant

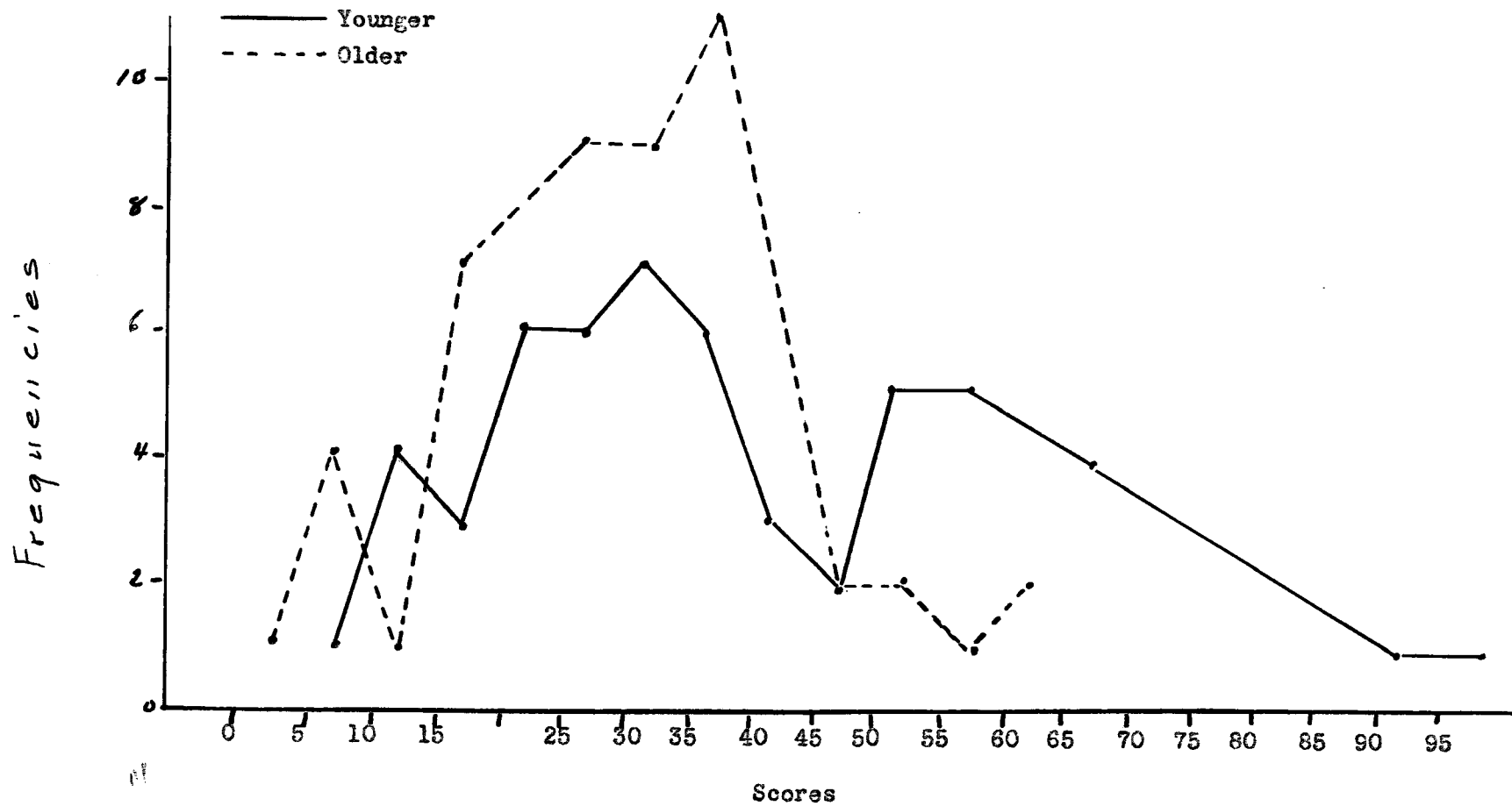


Fig. 11.- Frequency polygon of raw scores obtained on the language components of the Progressive Achievement Test by fifty-four youngest and sixty-three oldest seventh grade pupils

beyond the one per cent level of confidence.

The findings from the achievement test in this study lend support to the findings of Ruch<sup>1</sup>: Who found older subjects in his study to be inferior to the younger subjects in learning of all types of materials.

The derived mean score for each group on the total achievement test and on each component of the test were used to identify the grade equivalent to determine how the subjects of this study compared with the more than one hundred thousand pupils used to establish the norms of the Progressive Achievement Tests. Table 12 shows the comparison.

TABLE 12

A COMPARISON OF GRADE PLACEMENT AND AGE OF THE YOUNGER SUBJECTS OF THE STUDY WITH THE TEST NORMS

Trait	Subject's Mean Raw Score	Norm Aver. Gr. Placement	Norm Aver. Age in Mo.	Amount of Grade Retarded
Total				
Achieve.	117	5.2	128	2.5
Reading	48.6	5.3	129	2.4
Arithmetic	32.0	5.3	130	2.5
Language	38.8	5.0	126	2.7

The younger subjects had an average grade placement of 5.2 for achievement and are retarded 2.5 years, as measured by the Progressive Achievement Tests. The older pupils had a grade

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<sup>1</sup>F. M. Ruch, "The Differentiative Effects of Age Upon Human Learning," Journal of General Psychology, XI (October, 1934), 261-86.

placement of 4.7, and at the time the test was administered, April 1950, had achieved equally as well as pupils who had been seven months in the fourth grade. This group was retarded five months more in achievement, according to the instrument used, than the younger group.

The younger subjects appear to be superior to the older subjects in their over all achievement, as measured by the Progressive Achievement Tests. There was a significant difference in the abilities of the two groups to read, to do arithmetic, and to achieve in the language areas. Each of these differences was in favor of the younger group. For this reason it can be assumed with considerable confidence, that the average younger seventh-grade pupil of this study could, at the time of this study, excel the average older seventh-grade pupil in the three basic areas measured by the tests.

There was no significant difference found in the mental maturity, as measured by the New California Short-Form Test of Mental Maturity, of the younger subjects when compared with the older subjects of the study. However, there was a difference in the two groups on the non-language parts of the test, which was significant beyond the one per cent level on confidence. This difference was in favor of the older subjects of the study, and leads the writer to believe that if the school offered more experiences in non-language activities these pupils might be able to approximate the norms for their level.

The total personality adjustment of the younger pupils was no different from that of the older pupils. But a slight

difference appeared in the self adjustment area in favor of the younger subjects. There is a need for experiences that will give opportunities for personality adjustments to both groups of subjects.

The analysis of the data revealed a significant difference, at the five per cent level of confidence in the behavior problems of the two groups. The difference is in favor of the younger subjects.

There is a significant difference in the academic achievement of the younger and older subjects. In all factors of the tests this difference is will beyond the one per cent level of confidence and in favor of the younger subjects. But even the younger group scored far below the norm and is retarded two years and five months, according to the instrument used.

Implications of the Present Study to Education Theory and Practice.-- The findings in this study revealed only a few differences between the older and younger pupils on the personality and mental maturity tests; however, they indicated differences in every area of the achievement tests, and these differences always placed the younger children in higher score brackets than the older children. These data may be interpreted to mean that the younger children do better in the usual school work, but are not quite so well adjusted or as able to cope with non-language situations as the older children.

The schools for Negroes in Macon should utilize these facts in planning its program for the seventh-grade pupils. Some suggestions that may follow are:

The schools may set up a program in home-making, in which girls, and particularly those who are handicapped in language situations will receive training that may help them in making adjustments to the situations encountered in the various aspects of their lives.

A program of instruction in industrial art and some phase of mechanical art would give experiences to boys who lack the ability to make adjustments in language situations in the school program and who seem to be limited in some of the several areas of self-adjustment.

Athletics should be given a more significant place in the school program. Many boys and girls are able to compete or excel in athletics when unable to adjust themselves in language experiences in the school.

The programs for the schools should include experiences that will benefit all of the children. In other words, an effort should be made to plan activities which will provide opportunities for the development of the children according to their particular limitations rather than to differentiate solely on the basis of age. However, the older children do need more attention in schoolwork than do the younger ones.

## CHAPTER III

### SUMMARY AND CONCLUSIONS

This study was to compare the mental maturity, personality adjustment, behavior problems, and academic achievement of one hundred seventeen Negro seventh-grade pupils as revealed by the New California Short-Form Test of Mental Maturity, the California Test of Personality, the Stogdill Behavior Cards, and the Progressive Achievement Test.

The subjects involved in the study were one hundred seventeen pupils in the seven elementary schools for Negroes in Macon, Georgia during the school term 1949-50. The students included fourteen boys and forty girls, twelve years of age and under; and thirty-eight boys and twenty-five girls fifteen years of age and over.

The normative survey method of research was employed in gathering data for the study. Tests and statistics were the specific techniques employed. The four tests used in the study were administered by the writer according to the directions in each manual. The writer scored each set of tests by comparing the answer given by the subject with the answer key provided with each test. The data derived from administering the test were analyzed and interpreted with the results presented in Chapter II above.

The purpose of the study was to determine the differences,



if any, in the mental maturity, personality adjustment, behavior problems, and academic achievement of the two groups of subjects in the study.

The data were presented for the one hundred seventeen subjects as a whole, the fifty-four youngest seventh-grade pupils enrolled in the schools for Negroes, and the sixty-three oldest seventh-grade pupils in those schools.

The mean, the difference between the means of the two groups, the standard error of the difference, and the value of "t" were computed from the raw scores obtained by the two groups for each test and for each major component of each test.

The difference between the means of the younger subjects and the older subjects for mental maturity was 2.3, and the value of "t" was 1.2.

For personality adjustment the two groups had a difference in mean scores of 0.4, and "t" was 0.2.

Raw scores from the Stogdill Behavior Cards revealed a difference in the two means of 3.6, and the computed "t" was 2.2.

The difference for the two means for the achievement test was 26.1, and the value of "t" was 4.3.

In as much as a majority of the subjects show signs of abilities in non-language areas, it might be well to administer some special types of tests in the schools to pupils at this level so as to aid in locating and predicting the areas where these pupils will be most likely to succeed. Such an experience might contribute to their achievement, adjustment, or well being, or perhaps to all of these factors.

The following conclusions are based directly upon data presented in Chapter II and are answers to the specific questions proposed in Chapter I.

1. There is no significant difference in the mental maturity of the younger and older subjects of the study.

2. There is a significant difference, at the five per cent level of confidence, in the self adjustment factor of the personality development of the younger and older subjects of the study. This difference favors the younger subjects.

There is no real difference in the total personality development of the younger and older subjects of the study.

3. There is a significant difference, beyond the one per cent level of confidence, in the behavior problems of the younger and older subjects of this study.

4. There is a significant difference, well beyond the one per cent level of confidence, in the academic achievement of the younger and older subjects. This difference existed on each factor of the tests in favor of the younger pupils.

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## APPENDICES

## APPENDIX A

TABLE I

UNGROUPEd RAW SCORES OBTAINED BY ONE HUNDRED SEVENTEEN NEGRO GIRLS AND BOYS ON THE CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY, CALIFORNIA TEST OF PERSONALITY, STODDILL BEHAVIOR CARDS, AND PROGRESSIVE ACHIEVEMENT TEST

Subjects	Mental test	Personality test	Behavior cards	Achievement test	C. A.
1.	45	116	15	111	146
2.	44	128	10	160	150
3.	31	118	8	82	147
4.	48	121	5	134	154
5.	43	122	9	114	154
6.	45	124	18	109	152
7.	49	96	20	99	148
8.	40	88	31	71	146
9.	38	128	21	80	150
10.	47	94	20	91	154
11.	48	114	27	88	149
12.	32	81	39	101	149
13.	51	135	21	69	152
14.	39	94	21	67	153
15.	55	119	32	160	150
16.	41	117	17	116	154
17.	50	105	10	140	144
18.	44	104	17	82	152
19.	38	100	20	105	135
20.	39	114	15	104	148
21.	46	115	25	81	151
22.	32	131	9	122	154
23.	45	129	27	119	144
24.	46	121	11	135	152
25.	45	130	13	135	145
26.	43	131	14	75	154
27.	43	129	16	100	149
28.	34	123	7	94	154
29.	40	113	28	106	150
30.	38	104	20	129	147
31.	35	127	12	77	145
32.	45	120	23	135	151
33.	37	97	22	97	152
34.	75	128	14	266	152
35.	45	126	12	166	152
36.	53	114	9	194	155

TABLE I (Continued)

Subjects	Mental test	Personality test	Behavior cards	Achievement test	C. A.
37.	57	124	9	173	145
38.	42	116	7	204	151
39.	38	135	13	147	146
40.	30	97	24	104	144
41.	50	117	22	142	151
42.	60	99	28	146	150
43.	46	81	25	88	150
44.	22	104	30	106	153
45.	19	79	17	101	145
46.	50	124	22	152	144
47.	43	123	14	167	147
48.	31	103	38	87	151
49.	34	111	21	87	149
50.	47	100	24	106	152
51.	66	115	22	173	155
52.	42	92	17	68	149
53.	32	105	11	113	157
54.	45.	130	8	105	154
55.	30	113	17	125	186
56.	39	126	21	106	192
57.	45	103	45	115	185
58.	30	115	39	101	192
59.	40	86	33	74	192
60.	26	100	11	68	192
61.	53	122	12	118	191
62.	22	97	22	102	192
63.	51	106	17	141	185
64.	22	115	35	89	192
65.	32	95	33	146	192
66.	27	104	29	83	192
67.	50	120	11	73	192
68.	30	108	18	87	182
69.	49	93	23	93	186
70.	36	58	23	89	192
71.	57	117	27	82	191
72.	38	94	22	90	184
73.	41	104	9	74	190
74.	29	110	32	76	190
75.	32	63	29	57	192
76.	49	120	47	76	186
77.	37	108	9	91	188
78.	26	102	35	95	192
79.	53	108	13	117	180
80.	50	102	20	93	189
81.	40	85	40	86	192
82.	51	81	12	70	184
83.	52	116	19	115	183

TABLE I (Continued)

Subjects	Mental test	Personality test	Behavior cards	Achievement test	C. A.
84.	35	110	23	80	183
85.	30	102	22	78	189
86.	49	123	6	44	192
87.	26	122	10	61	192
88.	47	98	38	69	192
89.	32	107	6	82	192
90.	51	115	18	118	182
91.	49	68	29	78	190
92.	50	114	24	133	184
93.	35	113	117	118	184
94.	45	104	17	88	180
95.	39	122	17	73	192
96.	37	132	12	87	192
97.	40	132	10	113	192
98.	35	127	19	84	186
99.	54	92	23	93	191
100.	43	117	37	84	191
101.	43	71	29	107	186
102.	50	121	20	149	188
103.	40	129	11	108	192
104.	42	120	28	91	190
105.	45	128	23	124	192
106.	40	67	33	72	180
107.	37	106	32	89	182
108.	37	124	19	85	182
109.	30	95	12	97	185
110.	47	100	9	107	180
111.	42	111	18	59	186
112.	49	113	21	63	182
113.	61	122	15	84	180
114.	53	91	39	123	191
115.	60	139	12	122	192
116.	39	110	19	61	192
117.	36	119	43	67	192



## APPENDIX B

# NEW CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY

## INTERMEDIATE '47 S-FORM

Devised by Elizabeth T. Sullivan, Willis W. Clark, and Ernest W. Tiegs

Name..... Occupation or Grade.....

Date..... Age..... Birthday..... Sex: M-F

Instructor or Examiner..... Business or Institution.....

		DIAGNOSTIC PROFILE (Chart scores here)															Per- cent- ile Rank
		Mental Age (Chart scores here)															
TEST	FACTORS	Possible Score	Exami- nee's Score	Mo. Yr.	96	120	132	144	156	168	180	192	204	216	240	288	
					8.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	20.0	24.0	
Spatial Relationships . . .	35				7	10	15	20		25			30			35	
	1. Sensing Right and Left*	20		*	5	8	10	12	14	15	16	17		18	19	20	
	2. Manipulation of Areas*	15		*	2	6	7	9	10	11	12		13	14		15	
Logical Reasoning . . .	30				1	5		10		15		20		25		30	
	3. Similarities*	15		*	1	3	4	5	6	7	8	9	10	11	12	14	
	4. Inference	15			0	1	2	3	4	5	6	7	8	9	10	11	
Numerical Reasoning . . .	30					1		5		10		15		20	25		
	5. Number Series*	15		*	0	1	2	3	4	5	6	7	8	9	12	14	
	6. Numerical Quantity	15			0	1	2	3	4	5	6	7	9	11	12	13	
Vocabulary (Test 7)	50				1	5	10	15	20	25	30	35		40	45	49	
Total Mental Factors	145				15	34	44	52	61	71	80	89	96	105	121	141	
Language Factors (4+6+7)	80				4	16	22	27	33	38	45	50	54	58	67	78	
Non-Language Factors (1+2+3+5)	65				11	18	22	25	28	33	35	39	42	46	54	63	
Chronological Age					96	120	132	144	156	168	180	192	204	216	240	288	
Actual Grade Placement (Grade examinee is in)					3	4	5	6	7	8	9	10	11	12	13	14	
				Yr.	8.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	20.0	24.0	
				Mental Age													
				Mo.	96	120	132	144	156	168	180	192	204	216	240	288	

\*Non-Language Tests






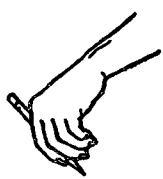








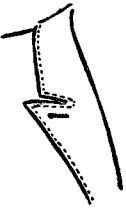

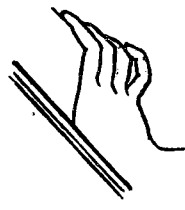





## SUMMARY OF DATA

	Score	M. A.	÷	C. A.*	=	I. Q.
Total Mental Factors	_____	_____	_____	_____	_____	_____
Language Factors	_____	_____	_____	_____	_____	_____
Non-Language Factors	_____	_____	_____	_____	_____	_____

\* Age 16 and older, divide by 192 months.

# TEST 1.



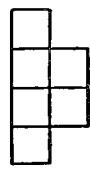
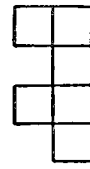
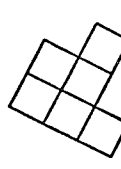
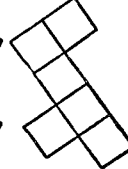
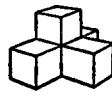
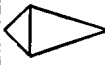









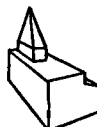
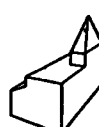

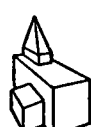









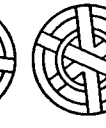


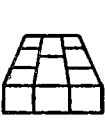
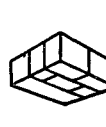
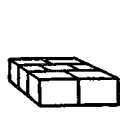
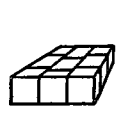

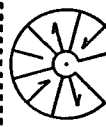

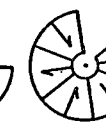
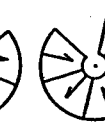
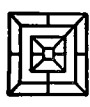
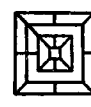
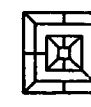
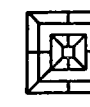
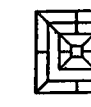







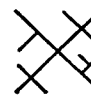

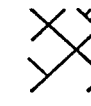
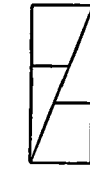
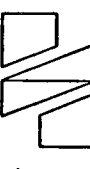
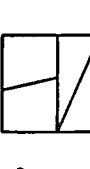
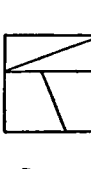






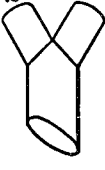




**Directions:** Put a circle around the letter R in all rights. Put a circle around the letter L in all lefts.

A					B				
									
(R) L					R (L)				
1	2	3	4	5	6	7	8	9	10
									
R L	R L	R L	R L	R L	R L	R L	R L	R L	R L
11	12	13	14	15	16	17	18	19	20
									
R L	R L	R L	R L	R L	R L	R L	R L	R L	R L

Test 1. Score (number right).....

# TEST 2.

Directions: In each row find a drawing that is either the same or different views of the first drawing. Put an X on the line under this drawing and put the number of the drawing you mark on the line to the right.

 <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>A</div> </div>	<div>8</div>      <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>8</div> </div>
 <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>1</div> </div>	<div>9</div>      <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>9</div> </div>
     <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>2</div> </div>	<div>10</div>      <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>10</div> </div>
     <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>3</div> </div>	<div>11</div>      <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>11</div> </div>
     <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>4</div> </div>	<div>12</div>      <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>12</div> </div>
     <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>5</div> </div>	<div>13</div>      <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>13</div> </div>
     <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>6</div> </div>	<div>14</div>      <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>14</div> </div>
     <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>7</div> </div>	<div>15</div>      <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>15</div> </div>

Test 2. Score (number right).....

# TEST 3.

Directions: The first three objects in each row are alike in some way. Find another object in the same row that belongs with them. Put an X on the line under it and put the number of the object you mark on the line to the right.

<p>A</p> <p>1. _____ 2. _____ 3. _____ 4. _____ A. _____</p>	<p>8</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 8. _____</p>
<p>1</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 1. _____</p>	<p>9</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 9. _____</p>
<p>2</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 2. _____</p>	<p>10</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 10. _____</p>
<p>3</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 3. _____</p>	<p>11</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 11. _____</p>
<p>4</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 4. _____</p>	<p>12</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 12. _____</p>
<p>5</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 5. _____</p>	<p>13</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 13. _____</p>
<p>6</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 6. _____</p>	<p>14</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 14. _____</p>
<p>7</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 7. _____</p>	<p>15</p> <p>1. _____ 2. _____ 3. _____ 4. _____ 15. _____</p>

Test 3. Score (number right).....

**Directions:** Read each group of statements and draw a line under the correct logical answer.  
Write the number of this answer on the line to the right.

0. All four-footed creatures are animals.  
All horses are four-footed. Therefore

- <sup>1</sup> Creatures other than horses can walk  
<sup>2</sup> All horses can walk  
<sup>3</sup> All horses are animals

3 0

1. Mr. X is an aviator.

Mr. X is scout-master for his home town.  
Therefore

- <sup>1</sup> Aviators make good scout-masters  
<sup>2</sup> One aviator is a scout-master  
<sup>3</sup> Scout-masters make good aviators

\_\_\_\_\_ 1

2. Three boys are on a mountain trail.

Dick is farther up the trail than Dan.

Frank is farther up than Dick.

Which boy is in the middle position on the trail?

- <sup>1</sup> Dick    <sup>2</sup> Dan    <sup>3</sup> Frank

\_\_\_\_\_ 2

3. No human beings are exempt from accidents. Automobile drivers are human beings.  
Therefore

- <sup>1</sup> No human being is dependable  
<sup>2</sup> No automobile drivers are exempt from accidents  
<sup>3</sup> Few human beings make safe automobile drivers

\_\_\_\_\_ 3

4. If he remains with his friend he will suffer loss, and if he leaves his friend he will suffer loss; but he must remain with his friend or leave him. Therefore

- <sup>1</sup> He should remain with his friend  
<sup>2</sup> It takes courage to leave a friend  
<sup>3</sup> He will suffer loss

\_\_\_\_\_ 4

5. All squares have four equal sides.  
This figure does not have four equal sides.  
Therefore

- <sup>1</sup> It is a circle  
<sup>2</sup> It is not a square  
<sup>3</sup> It is either a triangle or a rectangle

\_\_\_\_\_ 5

6. He is either foreign-born or a native. But, he is not foreign-born. Therefore

- <sup>1</sup> He is a voter  
<sup>2</sup> He is a native  
<sup>3</sup> He is a soldier

\_\_\_\_\_ 6

7. Pine Street is parallel to River Drive.  
River Drive is parallel to Cypress Street.  
Therefore

- <sup>1</sup> Pine Street is east of River Drive  
<sup>2</sup> Cypress Street crosses Pine Street  
<sup>3</sup> Pine Street is parallel to Cypress Street

\_\_\_\_\_ 7

8. Either your sister is more intelligent than you, or as intelligent, or less intelligent.  
But, your sister is not more intelligent, nor is she less intelligent. Therefore

<sup>1</sup> Your sister is less intelligent than you

<sup>2</sup> Your sister is as intelligent as you

<sup>3</sup> Your sister is more intelligent than you \_\_\_\_\_ 8

9. Jim has a better batting average than Ed.  
Ed has a better batting average than Bill.  
Which has the best batting average?

<sup>1</sup> Jim    <sup>2</sup> Bill    <sup>3</sup> Ed

\_\_\_\_\_ 9

10. A weighs less than B.

B weighs less than C. Therefore

<sup>1</sup> B weighs more than C

<sup>2</sup> A's weight is equal to B's and C's

<sup>3</sup> A weighs less than C \_\_\_\_\_ 10

11. The box contains either gold or silver or crystal. It does not contain silver. Therefore

<sup>1</sup> It contains crystal

<sup>2</sup> It contains either gold or crystal

<sup>3</sup> The conclusion is uncertain \_\_\_\_\_ 11

12. If he is to keep his place on the team he must avoid disputes with the captain and the coach.

But, he will not avoid disputes with the captain, or he will not avoid disputes with the coach. Therefore

<sup>1</sup> He will not remain on the team

<sup>2</sup> He will lose in popularity with the school

<sup>3</sup> He may have a reasonable complaint \_\_\_\_\_ 12

13. If the claim is unjust, refusal to permit its discussion before the Student Council is unwise.

If the claim is just, refusal is inexcusable.

But, the claim is either unjust or it is just.  
Therefore

<sup>1</sup> The refusal is justified

<sup>2</sup> The refusal is being discussed freely

<sup>3</sup> The refusal is either unwise or inexcusable \_\_\_\_\_ 13

14. A's house is situated northeast of B's.

B's house is situated northeast of C's.

Therefore

<sup>1</sup> A's house is situated nearest to C

<sup>2</sup> C's house is nearer to A's house than to B's

<sup>3</sup> A's house is situated to the northeast of C's \_\_\_\_\_ 14

15. W is between X and Y.

X is between Y and Z. Therefore

<sup>1</sup> W is not between Y and Z

<sup>2</sup> W is between X and Z

<sup>3</sup> W is nearer to X than to Z \_\_\_\_\_ 15

**Directions:** In each row of numbers below, there is one that is wrong. Find this wrong number among the answer numbers on the right and write its letter on the line to the right. In Sample A, the wrong number is 9, so letter *b* is written on the line to the right.

Sample:

A.	2	4	6	8	9	10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Go right on with the following until told to stop. In each row of numbers below, the numbers grow larger or smaller in a regular series of whole numbers. Decide what numbers are missing, find them among the answers at the right, and write the letter of your choice for the correct answer on the line to the right. In Sample B, the missing numbers are 4, 12, so letter *c* is written on the line to the right.

Sample:

B.	2	....	7	9	....	14	17				a 3, 11	b 4, 11	c 4, 12	d 5, 11	e 3, 12	<u>  C  </u> B
(11).	1	4	....	10	....	....	19				a 5, 11, 18	b 7, 13, 16	c 5, 13, 16	d 7, 11, 18	e 5, 16, 18	<u>          </u> 11
(12).	2	....	8	....	32	....					a 7, 13, 33	b 4, 16, 37	c 3, 15, 48	d 4, 16, 64	e 6, 24, 64	<u>          </u> 12
(13).	44	37	....	....	16	....	2				a 30, 22, 8	b 31, 22, 9	c 30, 23, 9	d 30, 21, 9	e 31, 23, 8	<u>          </u> 13
(14).	6	....	28	....	50	....	72				a 16, 38, 60	b 16, 39, 61	c 17, 38, 60	d 11, 39, 61	e 17, 39, 61	<u>          </u> 14
(15).	83	70	....	44	....	....	5				a 57, 31, 18	b 53, 33, 23	c 57, 33, 19	d 53, 31, 18	e 57, 33, 19	<u>          </u> 15

# TEST 6.

**Directions:** Work these problems on a blank sheet of paper. Write the letter of the answer on the line to the right. The correct answer for the first problem (0) is b.

0. If you earn \$5.00 and spend \$3.00, how many dollars will you have left?  
 Ans.: a \$1.00 b \$2.00 c \$3.00 d \$5.00      b   0

1. If a freight train travels at the rate of 20 miles an hour, how many miles will it travel in 4 hours?  
 Ans.: a 5 b 24 c 80 d 60           1

2. How many lemons can you buy for 15 cents at the rate of 4 for 5 cents?  
 Ans.: a 9 b 12 c 15 d 60           2

3. On a road map each one-half inch represents 20 miles. How many miles are represented by 5 inches?  
 Ans.: a 10 b 20 c 100 d 200           3

4. Large envelopes that sell for 3 cents each can be had for 30 cents a dozen. How much is saved when bought by the dozen?  
 Ans.: a 10c b 6c c  $2\frac{1}{2}$ c d 9c           4

5. How many one-inch cubes can be placed in a box 5 inches long, 4 inches wide, and 3 inches high?  
 Ans.: a 12 b 23 c 60 d 100           5

6. If you had 20 words in spelling and were marked 90%, how many words did you spell correctly?  
 Ans.: a 1 b 11 c 18 d 19           6

7. How many  $1\frac{1}{2}$  cent stamps would you give in even exchange for 30 one-half cent stamps?  
 Ans.: a 10 b 15 c 20 d 45           7

8. A ball team played 25 games and won 7 games more than it lost. How many games did it win?  
 Ans.: a 7 b 9 c 16 d 18           8

9. How many sheets of paper 7 inches by 10 inches can you cut from a sheet of paper 21 inches by 30 inches?  
 Ans.: a 3 b 6 c 9 d 34           9

10. How much will picture molding for a room 15 feet by 16 feet cost at 10 cents a foot?  
 Ans.: a \$1.10 b \$6.20  
           c \$30.00 d \$24.00           10

11.  $2\frac{1}{2}$  times what number equals 40?  
 Ans.: a 16 b 8 c 15 d 17           11

12. If a cubical block of ice 5 inches square weighs  $6\frac{1}{4}$  pounds, how many pounds will a cubical block 10 inches square weigh?  
 Ans.: a  $12\frac{1}{2}$  b  $11\frac{1}{4}$  c 50 d 100           12

13. What is the number which if multiplied by 2 is 4 less than 3 times 6?  
 Ans.: a 6 b 7 c 14 d 8           13

14. Jim says his age is  $\frac{1}{4}$  of his uncle's, and that their ages together total 40 years. How many years difference is there between Jim's and his uncle's age?  
 Ans.: a 10 b 20 c 24 d 30           14

15. A tank is fed by two pipes, one of which can fill it in 2 hours, and the other in 3 hours. A third pipe can empty it in 1 hour. If the tank is full and all three pipes are opened and operating to full capacity, how many hours will it take to empty the tank?  
 Ans.: a 2 b 4 c 5 d 6           15



# TEST 7.

**Directions:** Draw a line under the word which means the same or about the same as the first word. Write the number of this word on the line to the right, as:

- |                |  |     |                 |  |    |
|----------------|--|-----|-----------------|--|----|
| 0. blossom     | <sup>1</sup> tree <sup>2</sup> vine<br><sup>3</sup> flower <sup>4</sup> garden                 | 3 0 | 26. detect      | <sup>1</sup> remove <sup>2</sup> discover<br><sup>3</sup> overtake <sup>4</sup> apply            | 26 |
| 1. strange     | <sup>1</sup> real <sup>2</sup> tell<br><sup>3</sup> certain <sup>4</sup> unknown               | 1   | 27. reluctantly | <sup>1</sup> gladly <sup>2</sup> instantly<br><sup>3</sup> certainly <sup>4</sup> unwillingly    | 27 |
| 2. reply       | <sup>1</sup> news <sup>2</sup> answer<br><sup>3</sup> note <sup>4</sup> open                   | 2   | 28. inefficient | <sup>1</sup> inevitable <sup>2</sup> prudent<br><sup>3</sup> incompetent <sup>4</sup> unruly     | 28 |
| 3. liberty     | <sup>1</sup> benefit <sup>2</sup> seize<br><sup>3</sup> freedom <sup>4</sup> aid               | 3   | 29. facetious   | <sup>1</sup> active <sup>2</sup> fragile<br><sup>3</sup> humorous <sup>4</sup> inventive         | 29 |
| 4. assist      | <sup>1</sup> consent <sup>2</sup> help<br><sup>3</sup> agree <sup>4</sup> overlook             | 4   | 30. ambiguous   | <sup>1</sup> thoughtful <sup>2</sup> doubtful<br><sup>3</sup> responsible <sup>4</sup> confident | 30 |
| 5. admire      | <sup>1</sup> defend <sup>2</sup> protect<br><sup>3</sup> approve <sup>4</sup> agree            | 5   | 31. utilize     | <sup>1</sup> harmonize <sup>2</sup> identify<br><sup>3</sup> use <sup>4</sup> invite             | 31 |
| 6. aim         | <sup>1</sup> offer <sup>2</sup> apply<br><sup>3</sup> haste <sup>4</sup> end                   | 6   | 32. dejected    | <sup>1</sup> involved <sup>2</sup> disheartened<br><sup>3</sup> weighty <sup>4</sup> destroyed   | 32 |
| 7. esteem      | <sup>1</sup> reject <sup>2</sup> estimate<br><sup>3</sup> exceed <sup>4</sup> respect          | 7   | 33. dexterity   | <sup>1</sup> affection <sup>2</sup> advantage<br><sup>3</sup> safety <sup>4</sup> skill          | 33 |
| 8. acquire     | <sup>1</sup> agree <sup>2</sup> conduct<br><sup>3</sup> obtain <sup>4</sup> conflict           | 8   | 34. defer       | <sup>1</sup> affirm <sup>2</sup> delay<br><sup>3</sup> confer <sup>4</sup> ordain                | 34 |
| 9. counsel     | <sup>1</sup> glory <sup>2</sup> advice<br><sup>3</sup> generous <sup>4</sup> satisfy           | 9   | 35. deride      | <sup>1</sup> advance <sup>2</sup> encourage<br><sup>3</sup> ennoble <sup>4</sup> ridicule        | 35 |
| 10. ample      | <sup>1</sup> season <sup>2</sup> plentiful<br><sup>3</sup> alive <sup>4</sup> autumn           | 10  | 36. concede     | <sup>1</sup> overrule <sup>2</sup> engage<br><sup>3</sup> allow <sup>4</sup> endeavor            | 36 |
| 11. amaze      | <sup>1</sup> agree <sup>2</sup> betray<br><sup>3</sup> surprise <sup>4</sup> contrary          | 11  | 37. invoke      | <sup>1</sup> hover <sup>2</sup> imitate<br><sup>3</sup> ask <sup>4</sup> invest                  | 37 |
| 12. oppress    | <sup>1</sup> promise <sup>2</sup> imitate<br><sup>3</sup> crowd <sup>4</sup> burden            | 12  | 38. coerce      | <sup>1</sup> varnish <sup>2</sup> adverse<br><sup>3</sup> treasure <sup>4</sup> compel           | 38 |
| 13. liberal    | <sup>1</sup> lonely <sup>2</sup> generous<br><sup>3</sup> learned <sup>4</sup> real            | 13  | 39. tarnish     | <sup>1</sup> frighten <sup>2</sup> blacken<br><sup>3</sup> lament <sup>4</sup> torment           | 39 |
| 14. predatory  | <sup>1</sup> wandering <sup>2</sup> stationary<br><sup>3</sup> plundering <sup>4</sup> lasting | 14  | 40. antecedent  | <sup>1</sup> actual <sup>2</sup> pretended<br><sup>3</sup> previous <sup>4</sup> genuine         | 40 |
| 15. obstinate  | <sup>1</sup> obedient <sup>2</sup> headstrong<br><sup>3</sup> satisfactory <sup>4</sup> saucy  | 15  | 41. disparage   | <sup>1</sup> divert <sup>2</sup> discredit<br><sup>3</sup> deprive <sup>4</sup> divide           | 41 |
| 16. eternal    | <sup>1</sup> worthy <sup>2</sup> brief<br><sup>3</sup> endless <sup>4</sup> native             | 16  | 42. impervious  | <sup>1</sup> empty <sup>2</sup> injurious<br><sup>3</sup> impenetrable <sup>4</sup> important    | 42 |
| 17. fugitive   | <sup>1</sup> fetter <sup>2</sup> accident<br><sup>3</sup> saddle <sup>4</sup> runaway          | 17  | 43. deleterious | <sup>1</sup> harmful <sup>2</sup> particular<br><sup>3</sup> tardy <sup>4</sup> just             | 43 |
| 18. legend     | <sup>1</sup> ancient <sup>2</sup> legion<br><sup>3</sup> story <sup>4</sup> leisure            | 18  | 44. presage     | <sup>1</sup> wisdom <sup>2</sup> precedent<br><sup>3</sup> foretell <sup>4</sup> promote         | 44 |
| 19. entreat    | <sup>1</sup> refuse <sup>2</sup> plead<br><sup>3</sup> repair <sup>4</sup> reform              | 19  | 45. surfeit     | <sup>1</sup> excess <sup>2</sup> excel<br><sup>3</sup> survey <sup>4</sup> feature               | 45 |
| 20. notable    | <sup>1</sup> terrible <sup>2</sup> brilliant<br><sup>3</sup> severe <sup>4</sup> famous        | 20  | 46. vertigo     | <sup>1</sup> greenish <sup>2</sup> truth<br><sup>3</sup> strength <sup>4</sup> giddiness         | 46 |
| 21. diminish   | <sup>1</sup> obtain <sup>2</sup> repeat<br><sup>3</sup> reduce <sup>4</sup> plentiful          | 21  | 47. quondam     | <sup>1</sup> quota <sup>2</sup> survivor<br><sup>3</sup> former <sup>4</sup> future              | 47 |
| 22. envious    | <sup>1</sup> amiable <sup>2</sup> jealous<br><sup>3</sup> boisterous <sup>4</sup> enormous     | 22  | 48. mandible    | <sup>1</sup> handcuff <sup>2</sup> jaw<br><sup>3</sup> law <sup>4</sup> forceful                 | 48 |
| 23. prophecy   | <sup>1</sup> suggestion <sup>2</sup> premium<br><sup>3</sup> substance <sup>4</sup> prediction | 23  | 49. odium       | <sup>1</sup> favor <sup>2</sup> blame<br><sup>3</sup> smell <sup>4</sup> poem                    | 49 |
| 24. corrode    | <sup>1</sup> collect <sup>2</sup> disintegrate<br><sup>3</sup> applaud <sup>4</sup> blame      | 24  | 50. chuff       | <sup>1</sup> peeve <sup>2</sup> churl<br><sup>3</sup> cliff <sup>4</sup> laugh                   | 50 |
| 25. invariably | <sup>1</sup> probably <sup>2</sup> sometimes<br><sup>3</sup> always <sup>4</sup> motionless    | 25  |                 |  |    |

# NEW CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY

## SCORING KEY—INTERMEDIATE '47 S-FORM

TEST 1	TEST 2	TEST 2 (Cont.)	TEST 3	TEST 3 (Cont.)	TEST 4	TEST 4 (Cont.)	TEST 5	TEST 6	TEST 6 (Cont.)	TEST 7	TEST 7 (Cont.)
		8. 4		8. 2		8. 2	(1). e		9. c or 9	1. 4	26. 2
							(2). b			2. 2	27. 4
							(3). a			3. 3	28. 3
	1. 3	9. 3	1. 3	9. 2	1. 2	9. 1	(4). d	1. c or 80		4. 2	29. 3
							(5). c		10. b or \$6.20	5. 3	30. 2
							(6). a			6. 4	31. 3
							(7). d	2. b or 12	11. a or 16	7. 4	32. 2
	2. 1	10. 4	2. 1	10. 2	2. 1	10. 3	(8). b			8. 3	33. 4
							(9). e			9. 2	34. 2
							(10). d	3. d or 200		10. 2	35. 4
						11. 2			12. c or 50	11. 3	36. 3
	3. 4	11. 2	3. 4	11. 4	3. 2					12. 4	37. 3
								4. b or 6c (credit 1/2c each)	13. b or 7	13. 2	38. 4
	4. 3	12. 4	4. 2	12. 2	4. 3	12. 1				14. 3	39. 2
								5. c or 60		15. 2	40. 3
										16. 3	41. 2
										17. 4	42. 3
	5. 2	13. 2	5. 3	13. 2	5. 2		(11). b		14. c or 24	18. 3	43. 1
						13. 3	(12). d	6. c or 18		19. 2	44. 3
							(13). c			20. 4	45. 1
							(14). e	7. a or 10		21. 3	46. 4
	6. 3	14. 3	6. 2	14. 4	6. 2	14. 3	(15). a			22. 2	47. 3
										23. 4	48. 2
								8. c or 16	15. d or 6	24. 2	49. 2
	7. 4	15. 4	7. 3	15. 3	7. 3	15. 3				25. 3	50. 2

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# MANUAL OF DIRECTIONS

## THE NEW CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY

### INTERMEDIATE '47 S-FORM

Devised by Elizabeth T. Sullivan, Willis W. Clark, and Ernest W. Tiegs

**Note:** This Manual contains directions for giving and hand scoring the Intermediate Series of the New California Short-Form Test of Mental Maturity.

**Machine Scoring:** A special set of directions for giving and scoring this test is furnished, when it is to be machine scored.

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#### I. PURPOSE OF THE TEST

This is a diagnostic test of mental maturity, designed for use with students in junior high school, or grades seven to ten inclusive, as well as in business and industry.

In order to provide a one-period test of mental maturity, this '47 short form of the California Test of Mental Maturity has been developed. The test sections selected for this purpose have been chosen to provide both language and non-language test situations in the major factors involved in intelligence or mental capacity. The tests are designed to secure as valid a measure of mental maturity<sup>1</sup> as can be secured by a one-period group test.

This short-form should be used when time, convenience, or local practice requires a one-period mental test. It will provide as reliable a measurement and more diagnostic information than most group intelligence tests in current use. Some of the significant features of the '47 short-form are as follows:

1. A diagnostic profile is provided to show graphically the status of each pupil in non-language, language, and total test mental ages and intelligence quotients. It also includes the chronological age and actual grade placement status of each pupil in relation to mental age.
2. It may easily be administered in one period.
3. It may be used as a power rather than a speed test and can be given without strict adherence to time limits. However, the suggested time limits given for convenience of administration should ordinarily be followed.
4. Although primarily diagnostic and analytical, this test also yields not one, but three mental ages (M.A.'s) and three intelligence quotients (I.Q.'s), —a non-language M.A. and I.Q., a language M.A. and I.Q., and a total test M.A. and I.Q. characteristic of the familiar intelligence test.
5. The elementary, intermediate, and advanced '47 short-form series can be used as "self-administering" tests, either with individuals or with groups.

<sup>1</sup> Based on comprehensive statistical analysis, including factor analysis, computation of bi-serial r's, reliability coefficients, and similar objective data for each of the test series. Users of the short-form are encouraged to examine the Manuals and tests of the complete California Test of Mental Maturity.

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## II. NATURE OF THE TEST

In general, the seven sections of this short-form mental maturity test sample the maturity of spatial relationships; of logical reasoning; of mathematical reasoning; and of useful concepts or vocabulary. Some of the tests are presented in verbal and others in non-language form in order to obtain a separate evaluation of mental processes with and without the use of language symbols.

Each series is thus built upon a plan which (1) takes into account recognized mental processes or functions, and (2) corresponds with present knowledge of the nature of mental growth and development.

## III. RELIABILITY

The reliabilities of the test sections are based on 700 pupils in grades 7 to 10 and 250 adults (with average mental age of 16 years and a standard deviation of 16 points in I.Q.). The reliability coefficients have been computed by the split-halves method and corrected by the Spearman-Brown formula. The reliabilities of the Total Mental Factors score and the major test sections are as follows:

	Grades 7-10	Adults
Total Mental Factors.....	.946	.952
Language Factors .....	.931	.942
Non-Language Factors .....	.887	.901
Spatial Relationships .....	.841	.862
Logical Reasoning .....	.850	.873
Numerical Reasoning .....	.872	.887
Vocabulary .....	.926	.928
No. of cases.....	700	250
S. D. (M.A. in Mo.).....	27	30

The probable error of estimate for an individual score varies from four months or less of mental age when the reliabilities are .90 and above to five or six months when reliabilities are .89 to .85.

The following table of intercorrelations show the relationships of the various test sections:

### INTERCORRELATIONS OF TEST SECTIONS

New California Short-Form Test of Mental Maturity  
Intermediate Short-Form  
(700 Cases—Grades 7-10)

	L.R.	N.R.	Voc.	TMF	Lang.	N-L
Spatial Relationships	.196	.287	.092	.451	.187	.734
Logical Reasoning		.447	.418	.623	.576	.529
Numerical Reasoning			.472	.664	.509	.554
Vocabulary				.713	.862	.374
Total Mental Factors					.872	.851
Language Factors						.516

## IV. VALIDITY

The following quotation from the *Manual* of the complete *California Test of Mental Maturity* applies to the '47 short-form.

"The validity of any mental test is difficult to establish; there are no purely objective criteria or standards which correspond to the factors or abilities in terms of which conceptions of mentality are currently described.

"The authors of these tests believe that the multiple-factors theory of intelligence comes nearer to explaining observable phenomena than does the strong cen-

tral-factor theory alone. They recognize the importance of philosophical contributions, but they believe that progress in determining the nature of mentality and the value of tests of mental maturity is dependent largely upon further studies in factor analysis which employ analytical and statistical techniques.\* This series of tests recognizes contributions already made by including samplings of verbal ability, mathematical ability, spatial relations, and logic. The existence of all of these as relatively independent and distinct factors is gaining acceptance. The traditional method of correlating the results of this series with the average of several other intelligence tests (protecting results by observing the usual cautions regarding sampling and other statistical safeguards) reveals that the general, or Total Mental Factors I.Q.'s obtained with this test may be used for comparative purposes with other intelligence tests. (The correlation between measurements obtained with the California Test of Mental Maturity and with the Stanford-Binet individual test, .88, is about as high as the correlation between retests of the Stanford-Binet itself.) However, dealing only with mental ages and intelligence quotients obscures and ignores the separate important factors which constitute mentality; and it is in terms of these factors that the abilities of persons should be diagnosed. This series attempts such a diagnosis on the basis of present knowledge; further evidence of validity must await further knowledge of the nature of mental maturity."

## V. STANDARDS

Norms appear on the last page of this Manual. These norms are comparable to those regularly obtained by the use of individual psychological examinations and well-standardized group tests.

Test data for 25,000 cases were utilized in deriving the norms for this edition of the short-form of each of the series. Test data from other standardized tests were also utilized in establishing the norms. The mental ages and intelligence quotients secured by use of these tests provide measurement for a typical situation, i.e., that represented by a standard deviation of 16 points I.Q. secured in a normal sampling.

The profile on the front page of each test booklet provides for a graphic representation of the non-language, language, and total test results in relation to a

\* Gullford, J. P.: *Psychometric Methods*, McGraw-Hill Co., 1936.  
Kelley, Truman L.: *Crossroads in the Mind of Man*, Stanford Univ. Press, 1928; also *Essential Traits of Mental Life*, Harvard Univ. Press, 1935.

Spearman, C.: *Pitfalls in the Use of Probable Errors*, Jr. of Educ. Psy., Vol. 23, No. 7; also a series of five articles on *The Factor Theory and Its Troubles*, in Jr. of Educ. Psy., Vol. 24, Nos. 7 and 8; and Vol. 25, Nos. 2, 4, and 5.

Thurston, L. L.: *The Theory of Multiple Factors, and A Simplified Multiple Factor Theory*, University of Chicago Book Store, 1935; also *The Vectors of Mind*, University of Chicago Press, 1935.

Tryon, Robert C.: *Multiple Factors vs. Two Factors as Determiners of Abilities*, Psy. Rev. 39, No. 4.

Thomson, G. H.: *The Factorial Analysis of Human Ability*, Houghton Mifflin Co., 1939.

mental age scale. Intelligence Quotient data are supplied on page 13 of this Manual

In addition, percentile norms are provided for ages 11, 12, 13, 14, 15, and 16 (incl. Adults). These percentile norms are given on pages 14 and 15 of this Manual.

The standardization population for the *New California Short Form Test of Mental Maturity*, Intermediate (Grades 7-10) and Advanced (Grades 9-Adult) Series, was obtained principally from a variety of school districts in various parts of the United States. The data were corrected for the selective factor so that the average I.Q. was 100 and the standard deviation of the distribution of I.Q.'s was 16. Percentile norms for various age groups and percentile ranks of I.Q.'s for various populations are provided. About two-thirds of the pupils were at the normal age for their grade, 20 to 25% were retarded, and approximately 10% were accelerated. Roughly 85% of this population was Caucasian and the remainder was Mexican, Negro, and other minority groups.

## VI. DESCRIPTION OF MENTAL MATURITY TESTS

### Tests 1 and 2. Spatial Relationships.

*(Tests 6 and 7 of the complete series)*

These tests reveal orientation in and ability to utilize spatial relationships. This perceptual ability is an important factor in mental life. The sensing and retention of geometric forms, appreciation of direction, and the manipulation of spatial relationships are fundamental functions and exist from an early age. The spatial factor may not appear to play so large a part in early life experiences as do the verbal, arithmetical, or memory factors, but it becomes increasingly important as children mature. The speed factor in manipulation of spatial relationships appears to have significance. The tendency for a form to persist in memory without ability to manipulate it is evidence of mental immaturity.

Test 1 reveals the individual's ability to orient himself in many complex situations involving the discrimination between right and left; Test 2 detects ability to use spatial imagery in manipulating spatial patterns in many different forms and positions.

In addition to their use in critical thinking, space concepts and relationships are used in simpler form in many of the daily educational, business, and industrial activities of individuals.

Global geography introduces new spatial concepts in addition to those previously required in dealing with maps, charts, and graphs. Writing, spelling, and drawing all involve space orientation. Plays and dramatizations involve space orientation with respect to the audience as well as to other players. Typewriting involves orientation of hands and fingers with respect to the keyboard. Playing an organ in-

volves the simultaneous space orientation and unified functioning of both hands and both feet. Even relatively simple tasks in the home economics kitchen or the business office often involve simultaneous space orientation to a number of factors, including the shape and size of the room, the equipment, the materials, and the operations.

A high score in these tests indicates ability to do well in the activities described above as well as to solve problems involving more intricate spatial relationships. Such persons should be able to give as well as follow directions; and they should do well in planning, layout, design, and construction.

A low score in these tests may be due to poor perception or memory, or both; if these two factors are unsatisfactory, the individual will need assistance in tasks involving space orientation and relationships. However, if the unsatisfactory status is due to lack of opportunity rather than ability, it may be improved through such assistance. The teacher or foreman) must be particularly careful in giving directions to such persons because they often find it difficult both to understand and to follow the many directions involving spatial relationships.

### Tests 3 and 4. Logical Reasoning.

*(Tests 10 and 15 of the complete series)*

The simpler elements of logical reasoning are involved in most educational as well as business and industrial activities. The mere identification of likenesses and differences in the meaning or appearance of words in reading and spelling; reading, obtaining meaning from the printed page, or the understanding of speech; or the try out and evaluation of a new color combination in elementary painting are examples. In general, no matter how simple the situation, wherever a problem requiring a decision or a choice of responses presents itself, the simpler aspects of logical reasoning function.

However, ability in logical reasoning develops from these simple beginnings through relatively simple and more complex problems of daily living to the critical thinking or reasoning involved in finding cures for insidious diseases, inventing radar, and perfecting instruments for defense or transportation.

As the individual matures, his educational and work activities should provide problems and situations which develop his powers of logical reasoning. He should become increasingly able to detect and use finer shades of meaning in reading and speech, to distinguish outward appearances from actualities in political and social problems, and to make more valid analyses and inferences in situations or problems involving cause and effect relationships in social studies, science, and everyday living.

Those who obtain a high score on Test 3, and a

low score on Test 4 may lack reading or memory ability. Test 7 should be checked in this connection.

When inability to reason logically is due to a remediable cause such as a very unfavorable environment over a period of years, the individual can be aided in improving his reasoning ability. However, where the environment has been favorable and he has had the commonly available opportunities a low score usually indicates an actual lack of capacity.

Such a person can neither perceive the fine distinctions of subtle and complex cause and effect relationships, nor can he plan or execute attacks on problems which require careful observation, discriminating analysis, the making of inferences, the projection of possible answers or solutions, and the ability to reach valid conclusions. Such individuals must be content to live on a relatively low intellectual plane; lacking facility in inference and generalization, they must be given principles and generalizations as facts, rather than attaining them as end products of logical reasoning; they must live in a concrete rather than an ideational world. However, this does not prevent them from becoming very skillful in such fields as music, the graphic arts, or activities involving construction. They should be tested for specific aptitudes and interests.

On the other hand, an individual whose score reveals high logical reasoning ability should be expected to grow in the functional elements outlined above. He should be expected to recognize the nature and implications of problems; to distinguish between evidence and propaganda; to project and test possible solutions; and to reach valid conclusions.

#### **Test 5 and 6. Numerical Reasoning.**

*(Tests 12 and 14 of the complete series)*

Many factor analysis studies have yielded a more or less independent factor of intelligence variously called number factor, number facility, or numerical reasoning.

This ability involves the recognition and use of likenesses, differences, and analogies, and the making of inferences with special respect to quantitative or number situations and problems.

Individuals who score high on these tests should do good thinking in arithmetic, the mathematical phases of shop work, the numerical phases of home economics having to do with recipes, proportions, and patterns, and the arithmetical problems of everyday life, involving expenses, income, bookkeeping, making change, and the like. At maturity they should do well in handling mathematical problems in business, engineering, and pure research.

If individuals who make low scores have not been denied the usual opportunities for developing this ability, such low scores suggest a deficiency in this

factor of intelligence. They need special help in developing number concepts and in using the fundamental arithmetical processes involved in solving numerical problems. They frequently lack an appreciation of the significance or value of money; they must frequently be assisted in relating income to prices and expenses; much that is quantitative in their environment escapes them; and they lack definiteness and preciseness in their reactions with others.

On the other hand, they may think well in the qualitative and emotional aspects of literature, music, and art, and do well in creative work which requires little or no numerical reasoning.

#### **Test 7. Vocabulary.**

*(Test 16 of the complete series)*

Because of the lack of better designation which is at the same time widely understood, Test 7 is called Vocabulary. However, this term signifies much more than mere connections between symbols and the realities for which they stand.

Ideas and meanings begin as perceptions which enter consciousness through the senses; if they are remembered, they may function in many relationships, spatial or non-spatial in nature, and they may be enriched and refined through use in logical and numerical situations. They finally emerge as concepts which are useful in thinking.

This verbal factor, called Vocabulary, is recognized as an important and relatively independent functional element of mental maturity.

Individuals who score high in this test possess the capacity to understand and profit from their experiences. They should do well in reading, literature, and drama which involve the understanding of symbols and the interpretation and projection of meanings through spoken and written language. They possess some of the basic abilities involved in understanding others and making others understand them.

However, a low or average score on this test is not proof of lack of capacity in the verbal factor; such a score may be due to lack of a favoring environment or training in the skills associated with this ability. Further study of the results of previous tests in this series is indicated. Individuals who score low on this test will profit less by reading, at least temporarily, than from other non-verbal types of educational activities.

### **VII. USING THE TEST RESULTS**

#### **General Considerations.**

The proper interpretation of test scores of an instrument such as the *New California Short-Form Test of Mental Maturity* requires the use of norms or standards. Thus, scores are interpreted as Mental ages, so that the person may be said to have the mental ability equal to that of a typical person of a given chronologi-

cal age. The Intelligence Quotient (I.Q.) is the ratio of mental age to actual age and indicates the extent to which a given individual has mental ability above or below the average for his chronological age.

Mental Ages are used as criteria of the level of ability at a given time. In both industrial relations and educational situations the mental age requirements of given occupations or assignments are often known. Thus, it is possible to relate the ability of an individual to duties or assignments which are appropriate to his mental abilities.

The Intelligence Quotient (I.Q.), being a ratio, and fairly constant, indicates the degree of ability that the individual has in comparison with others of his age. It is a convenient measure for use in considering the relative ability of a person in relation to the average (indicated by I.Q. 100). In the case of persons under the age of 16, it also provides a convenient means for determining the probable mental age at any given time. The actual, or chronological age of any person (using 16 years in the case of those over 16) may be multiplied by the I.Q. to determine the estimated mental age at any time. I.Q.'s are ordinarily interpreted<sup>1</sup> about as follows:

I. Q.	Descriptive Classification	Per Cent of Typical Population Included
130 & above	Very superior	3%
115-129	Superior	12%
100-114	High average	35%
85-99	Low average	35%
70-84	Inferior	12%
Below 70	Very inferior	3%

In general, the higher the score, mental age, or intelligence quotient, the more complex, abstract, and difficult the task or problem which an individual can handle. Mental ability is one of the most significant factors which must be given attention in education and in occupational adjustment. Frequently, the degree of intelligence is the controlling factor in success.

However, measures of capacity or intelligence should never be used alone, but should be considered in relation to other factors. One should not attempt to predict individual achievement from mental test data alone any more than one would attempt to judge an automobile on the basis of a single measure, such as height, weight, or length.

#### Language and Non-language Data.

Tests 1, 2, 3, and 5 are presented in graphic or non-

<sup>1</sup> The above distributions and percentages apply only to those tests such as the California Test of Mental Maturity and California Capacity Questionnaire which have provided for a normal, rather than skewed, distribution of mental ages and I.Q.'s. They would not apply in the cases of several intelligence tests which have arbitrarily allotted certain scores to higher mental ages without consideration of the normal probability curve, or which do not have a standard deviation of 16 points for a normal distribution of I.Q.'s.

language form. Tests 4, 6, and 7 are presented in language form.

As previously stated, one of the significant features of the *New California Short-Form Test of Mental Maturity* is that it provides Language M.A.'s and I.Q.'s and Non-Language M.A.'s and I.Q.'s as well as the customary total M.A.'s and I.Q.'s.

The *language test data* are particularly useful in indicating how well the individual understands relationships expressed in words, such as instructions, conference discussions, statements of logical principles or courses of action, and the like.

The *non-language test data* indicate how well the individual understands relationships among things or objects when language is not involved, such as physical or mechanical relationships.

There are significant differences in individuals between these two kinds of mental ability. Individuals may possess these two kinds of mental ability in very different amounts. It is not unusual for a person to have a language I.Q. of 70 or 80 and to have a non-language I.Q. above 100. Similarly, the reverse is frequently the case. Thus, the provision of both language and non-language measures affords greater insight into the mental processes of a given individual than is provided by the typical intelligence test. The significance of these additional data for guidance, selection, and placement is obvious in that they will make possible a more appropriate consideration of the real abilities of a person.

#### Mental Factors Data.

A detailed description of the nature, purpose, and significance of the mental tests included in the *New California Short-Form of Mental Maturity* is given in Section VI of this Manual. The tests are classified as Spatial Relationships, Logical Reasoning, Numerical Reasoning, and Vocabulary. Many specific suggestions regarding their interpretation are included in these descriptive statements, and it is recommended that the Section be carefully read by those who desire to obtain maximum diagnostic value from the test data.

The percentile norms provided on pages 14 and 15 of this Manual are useful in educational diagnosis, vocational guidance, and employee selection and placement. These norms indicate for each individual his relative rank in comparison with others of his age group in the various mental factors.

#### Other Educational Uses.

The use of measures of mental capacity is accepted in most school systems as an essential element in the counseling and guidance program and as information basic to fitting instruction to the needs of each pupil.

The Mental Ages obtained by use of the *New California Short-Form Test of Mental Maturity* are comparable to those obtained by most other intelligence tests. In addition, the (1) language mental ages and I.Q.'s and the (2) non-language mental ages and I.Q.'s provide diagnostic information which shows the extent to which the individual can think clearly when dealing with (1) word symbols, or (2) non-verbal situations. The separate factors data, as indicated above and in Section VI, are further aids in diagnosis.

The following are suggestions for the use of M.A.'s and I.Q.'s in individual guidance:

1. To evaluate or predict the achievement of an individual in academic subjects: Compare the mental age (or Intelligence Grade Placement) and the educational age (or subject grade placement). Achievement should tend to approximate the mental age of the individual.

2. To obtain data fundamental to vocational guidance: Reference should be made to suggestions given regarding personnel selection on page 7 of this Manual.

### Comparison of Intelligence and Achievement Test Medians

Intelligence quotients and intelligence grade placements are very useful in the following connections:

1. To determine whether or not a class, (or school) has made satisfactory progress in basic skills, and to set suitable standards of achievement.

The following table is based upon over 100 school surveys and 48,000 individual measurements. This table is presented to show the range of median intelligence quotients, median intelligence grade placements (mental ages in terms of school grades—see next to last column of Norms on the last page of this Manual), and median achievements in the essential skills as determined by these surveys.

### I.Q.'s AND RELATED DATA AS SHOWN BY SCHOOL SURVEYS

(Fractions of School Year above or below norm)

#### Class and School Medians

Per- cent- ile Rank	Intelli- gence Quo- tient	Intelli- gence Grade Place- ment	Read- ing Vocabu- lary	Read- ing Compre- hension	Arith- metic Reason- ing	Funda- mentals	Lan- guage
99	114	+.94	+.94	+.90	+.93	+1.08	+.93
95	110	+.74	+.72	+.81	+.60	+.85	+.76
90	108	+.61	+.46	+.62	+.42	+.70	+.56
80	105	+.37	+.30	+.38	+.29	+.43	+.35
70	103	+.26	+.20	+.18	+.18	+.27	+.21
60	101	+.13	+.10	+.08	+.09	+.13	+.10
50	100	.00	.00	.00	.00	.00	.00
40	98	-.10	-.09	-.16	-.17	-.07	-.12
30	96	-.18	-.16	-.29	-.34	-.20	-.21
20	94	-.27	-.33	-.40	-.59	-.39	-.34
10	89	-.50	-.53	-.60	-.87	-.57	-.54
1	75	-.88	-1.38	-1.83	-2.52	-.79	-1.36

The data are assigned percentile ranks and show the fractions of a school year above (+) or below (—) test norms for the subjects reported.

Thus, if the median I.Q. for a class (or school) is 105, such class (or school) is at the 80 percentile in intelligence when compared with the sampling of 48,000 cases measured. Such a class (or school) should normally be expected to have a median reading vocabulary score which is .30 of a year above normal, a median arithmetic fundamentals score which is .43 of a year above normal, etc. On the other hand, if the median I.Q. is below 100, the scores in basic skills will usually drop below the normal grade placement scores for average I.Q.'s. Thus, if the median I.Q. for a class (or school) is .94, reading comprehension scores .40 below normal grade placement scores for that class (or school) would be considered satisfactory.

2. To set a suitable standard of achievement for a class (or school): Determine the median I.Q. and add (or subtract) the appropriate grade placement fraction to (or from) the grade placement of the class (or school) tested. These data, however, should indicate the need for differentiated standards in directing the educational program and in evaluating the accomplishment of the schools and classroom groups.

In using mental age or the intelligence quotient in a given age or grade group, the following considerations should be kept in mind: The correlation or relationship between measurements of intelligence and academic success is far from perfect; in some subjects it is only 25 or 30 per cent better than chance. Although students with higher I.Q.'s will, in general do better than those with lower I.Q.'s, if they are about the same age, the teacher should always remember that other factors such as health, previously learned study habits, opportunity, persistence, encouragement, and the like play a large part in achievement.

It is particularly important in directing the learning of those having difficulty that teachers inspect the records for previous academic success in both language and non-language work, and obtain as many other types of pertinent information as possible in order that it may be used, together with the intelligence test data, and the diagnostic analysis of mental factors, in improving learning.<sup>1</sup>

### Business and Industrial Uses

Employment managers are concerned with both pre-service and in-service personnel. The *New California Short-Form Test of Mental Maturity* contributes significant information related to employee selection, employee placement, and employee adjustment.

When intelligence test data are used in employee selection and management, it is frequently more im-

<sup>1</sup> For additional discussion, see Educational Bulletin No. 14, *The Proper Use of Intelligence Tests*, and No. 15, *Vocational Guidance for Junior and Senior High School Pupils*. Los Angeles: California Test Bureau.



portant to know the minimum intelligence requirements for a given job than to know the average ability of those engaged in it. In other words, it is often easier to predict failures than successes by use of intelligence test data. It is desirable to establish a *critical score*, *M.A.*, *I.Q.*, or *classification* which will permit the inclusion of the greatest possible percentage of satisfactory applicants and the elimination of the greatest possible percentage of unsatisfactory applicants.

In addition to the establishment of "critical" low scores, much attention is now being given to determining the range of mental ability which appears to be appropriate to various job classifications.

1. **EMPLOYEE SELECTION.** In general, the more difficult the task, the higher the capacity required. As previously implied routine tasks or types of work are better done by employees of lower *I.Q.*'s because more intelligent employees are apt to become discontented. Since such instruments as the *California Short-Form Test of Mental Maturity* have been in use in vocational guidance and employment management, it has been found that successful functioning in typical positions requires minimum mental capacity (see classification on page 5) about as follows:

a. *Very Superior Ability.* In general, very superior ability is required in those persons who are engaged in the highest quality of creative or directive activity such as: President or general manager of a large manufacturing concern, lawyer, engineer with planning and managerial responsibilities of an involved nature, head of large bank, expert chemist, inventive genius, high-class journalist, judge, manager of large mercantile enterprise, physician or surgeon, research director, applied scientist, and statistician who utilizes advanced mathematical techniques.

b. *Superior Ability.* In general, superior ability is required in those persons who must exercise excellent judgment and arrive at logical conclusions regarding a course of action in fairly complicated and involved situations, such as: Accountant, auditor, advertising expert who plans copy, banking official, stockbroker, dentist, machinery designer, druggist, employment manager, electrical engineer, geologist, inventor of commercial appliances, typical lawyer, manager or superintendent of an average sized factory, wholesale merchant, army officer, ship officer, insurance company official, clergyman, newspaper reporter, private secretary to business or professional man, social work supervisor, teacher, veterinary doctor, and author of magazine articles.

c. *High Average Ability.* In general, high average ability is required in those persons dealing with tech-

nical supervision, abstract classifications and details, and the carrying out of previously arranged plans such as: Shop foreman, illustrator, express agent, appraiser, aviator, bank teller, bookkeeper, building contractor, department store buyer, caterer, railroad clerk, shipping clerk, census compiler, railway conductor, designer, detective, draftsman, locomotive engineer, marine engineer, minor executive, small factory foreman, hotel keeper, inspector, insurance agent, interior decorator, institution manager, librarian, smaller manufacturer, master mechanic, nurse, minor government official and inspector, photo engraver, photographer, printer, probation officer, retail dealer in such business as clothing, drugs, hardware, and the like, automobile salesman, stock and bond salesman, traveling salesman, social worker, statistical clerk, stenographer, art teacher, elementary teacher, telegraph operator, undertaker, and Y.M.C.A. secretary.

d. *Low Average Ability.* In general, low average ability is adequate for those persons dealing with specific processes in which definitions or directions are relatively simple, and the making of decisions as to policy or plans is not involved to any significant extent, but requiring good judgment and some discretion in operations, such as: Ticket agent, annealer or temperer of tools, bookbinder, cabinet maker, carpenter, retail cashier, chauffeur, chef, filing clerk, stock clerk, collector, compositor, street car conductor, dressmaker, dry cleaner, electrician, engraver, floor walker in store, landscape gardener, glassblower, tinsmith, harness maker, rivet worker, telephone linesman, machinist, auto mechanic, miller, milliner, motorman, moving picture operator, ornamental iron worker, general painter, metal pattern maker, plasterer, plumber and steam fitter, policeman, repairman, sales clerk, shop mechanic, sign painter, station agent, steeplejack, stonemason, tailor, telephone operator, tool maker, typist, upholsterer, vulcanizer, wheelwright, and wood-carver.

e. *Inferior Ability.* In general, inferior mental ability is adequate for those persons whose duties require that they follow simple and specific directions with little necessity for making significant plans or decisions, such as: Auto assembler, bell boy, blacksmith, boilermaker, brakeman, bricklayer, butcher, cobbler, concrete worker, cook, dairy hand, deliveryman, drayman, farm hand, finisher of metals, fireman, fisherman, foundry worker, hospital attendant, janitor, packer, wrapper, counter, lathe-hand, laundry worker, mail carrier, messenger boy, miller, miner, motorcyclist, motorman, munition worker, oilwell driller, semi-skilled machine operator, paper hanger, patrolman, porter, newsdealer, roofer, saw mill worker, butler, sheet metal worker, shipprigger, smelter worker,

soldier, stagehand, stonecutter, structural steel worker, switchman and flagman, textile worker, theatre usher, truck driver, and waiter in restaurant.

f. *Very Inferior Ability.* In general, very inferior mental ability is adequate for persons whose assignments require practically no judgment and who follow simple and specific directions usually under close supervision, such as: Day laborer, railroad section hand, boot-black, chamber maid, scrub woman, ditch digger, elevator operator, farm laborer, garbage collector, guard or watchman, hostler, junk man, street sweeper, and track layer.<sup>1</sup>

The list is intended to be suggestive of the minimum ability requirements which have been found to apply to typical positions. In instances where the duties of a given job are specialized, its classification might be changed. Job specifications, based on an analysis of the specific duties and operations required for given jobs, provide the basic data in determining the mental ability requirements, as well as other requirements for given positions. Civil service departments and employment managers are making such analyses for the purpose of preparing these specifications so that the selective criteria will be fitted to their particular needs.

It should always be remembered that, in addition to mental ability, there are other important factors involved in occupational efficiency and adjustment.<sup>2</sup>

2. **EMPLOYEE PLACEMENT.** Most businesses and industries have a sufficient variety of occupations so that a considerable range of mental ability is required in the various departments, and there are also significant differences within the departments themselves. Employment departments which accumulate data regarding the mental levels required for success in the jobs of the various departments will be able to establish critical mental ability scores so that they may select candidates who will have the mental capacity necessary for success. When the average I. Q.'s and the "critical" range of abilities which are found among the successful employees have been determined, more satisfactory placements will be obtained. Also, in the problem of up-grading employees, the knowledge of the level of ability of given persons is absolutely essential as a factor in determining their probable success.

Where a personnel department desires to do its work scientifically, it is recommended that all employees be tested and the average I.Q.'s and the varia-

tion of I.Q.'s of various departments be determined. These measures should be studied in relation to the service ratings and a range of scores or I.Q. groupings which give the highest probability of success should be established. New employees, or employees to be given the opportunity of promotion, can be selected from the standpoint of capacity so that they will have the optimum qualifications for meeting the intellectual requirements of the position. It is found that individual applicants will often be equally eligible to work in several different departments on the basis of I.Q. In this event, previous experience, interest, health, and personality data may be taken into consideration in making the most appropriate placement.

3. **EMPLOYEE ADJUSTMENTS.** It is frequently necessary to make adjustments and re-assignments of personnel. Since it has cost considerable to select, employ, and place an individual in the given business or industry, it is usually more profitable to try to re-adjust misplaced employees who are not succeeding in their given assignments. This is true, not only because of the cost of employment, placement, and training, but also because other considerations frequently require that they be given the opportunity for further adjustment.

The first step is to determine if the failure is due to lack of capacity; if so, replacement should be made into a simpler type of work. As previously indicated, this one factor is frequently of the greatest consequence.

In the relationships between labor and management, it is highly desirable that information be available regarding the mental ability of each of the employees. Those employees of low mental ability tend to be more gullible and suggestible. Also, they have fewer ideas and greater inertia. The higher the mental ability of employees, the greater the danger of dissatisfaction with working conditions, particularly when this higher ability is associated with personality defects, such as may be revealed by the *California Test of Personality*, the *Johnson Temperament Analysis*, or *Mental Health Analysis*.<sup>1</sup>

## VIII. DIRECTIONS FOR GIVING

(Note: For instructions regarding use as a "self-administering" test, see page 10.)<sup>\*</sup>

### MACHINE SCORING

When the *New California Short-Form Test of Mental Maturity, Intermediate '47 S-Form Series* is to be machine scored, it is necessary to use the machine-scoring edition test booklet, a special answer

<sup>1</sup> For additional discussion regarding the use of tests in business and industry see Ruch, F. L.: *How to Use Employment Tests*, Los Angeles: California Test Bureau, 1944. Price 50c.

<sup>1</sup> For similar additional information see Yoakum and Yerkes: *Army Mental Tests*; Bingham: *Aptitudes and Aptitude Testing*; Viteles: *Industrial Psychology*; Stead, Shartle and Associates: *Occupational Counseling Techniques*.

<sup>2</sup> Attention is called to the fact that certain personality factors, such as capacity for loyalty to the organization, self-reliance, ability to get along with others, and the like, are as essential as ability to do certain types of work. To provide an easily interpreted inventory of information as to personal and social adjustment, the *California Test of Personality* is recommended.

sheet, and a set of directions prepared for that purpose and furnished with the machine-scoring edition.

#### INSTRUCTIONS TO EXAMINER

The tests in this series are primarily analytical and diagnostic even though they furnish the customary M.A.'s and I.Q.'s. The intention is to secure as accurate an indication as possible of each person's status in the factors tested.

It is desirable that examinees shall understand clearly the manner in which they are expected to indicate their responses. However, the examiner must keep in mind that a testing rather than a teaching situation is desired and that correct responses should in no way be indicated, except in practice exercises and as instructed. Each examinee should have a lead pencil with an eraser, and a sheet of scratch paper to be used with Test 6.

Directions to be given examinees are in heavy black type.

#### TIME LIMITS

This is a power rather than a speed test. However, time limits should ordinarily be observed for each of the tests. They are ample for examinees to reach the practical limits of their abilities, and are intended primarily as aids in administering the tests.

The test should be given in one period.

#### INSTRUCTIONS TO EXAMINEES

Each examinee should fill in identifying data on the front cover page of the test booklet. Then the examiner will state: This booklet contains a variety of problem solving situations which I want you to try. After I give you the directions for each test, you will begin when I say "Ready, begin." You are to work as rapidly as you can without making mistakes. When you have completed a page or have done as much of it as you can, wait for further directions.

Now, open your booklet and fold back the page like this. (Demonstrate and be sure that examinees have the same test.)

#### TEST 1

Look at all these pictures of hands and feet and other objects. Under each picture is a letter R, meaning right, and a letter L, meaning left. The directions are: Put a circle around the letter R in all rights. Put a circle around the letter L in all lefts. The first two, A and B, are correctly marked. Ready, begin.

Allow 3 minutes.

Now turn your booklet over to Test 2.

#### TEST 2

Look at the first drawing in Row A. Now look at all the other drawings in Row A. (Examiner points to the drawings in Row A.) The first drawing is among the other drawings in this row but it is turned around. It is number 4. Put an X on the line under the fourth drawing and a 4 on the A line to the right. Do it now. (Pause.) The directions are: In each row, find the drawing that is either the same or different views of the first drawing. Put an X on the line under this drawing and put the number of the drawing you mark on the line to the right. Do not give too much time to any one item. You will have just eight minutes Ready, begin.

Allow 8 minutes.

Now turn the page over to Test 3 and fold it back.

#### TEST 3

Look at the pictures in Row A. (Examiner points to the pictures in Row A.) The first three objects are alike in some way. What way? (Let the group respond.) Yes, they are flowers. Now look along Row A to the right and find something else like them. Which one is it? (Let the group respond.) Yes, the flower is right. It belongs with the first three in this row. So put an X on the line under it and put a 4 on the line to the right. Do it now. (Pause.) The directions are: The first three objects in each row are alike in some way. Find another object in the same row that belongs with them. Put an X on the line under it and put the number of the object you mark on the line to the right. Do not give too much time to any one item. You will have just five minutes. Ready, begin.

Allow 5 minutes.

Now turn your booklet over to Test 4.

#### TEST 4

The directions are: Read each group of statements and draw a line under the correct logical answer. Write the number of this answer on the line to the right. In Sample 0, the correct answer is number three. All horses are animals. A line is drawn under it and a 3 is put on the line to the right. You will have ten minutes. Ready, begin.

Allow 10 minutes.

Now turn the page over to Test 5 and fold it back.

#### TEST 5

Look at the first row of numbers in Sample A on this page: 2, 4, 6, 8, 9, 10. You see that the numbers count up by twos, but there is one wrong number. Which one is it? (Pause.) Yes, 9. The numbers should be 2, 4, 6, 8, 10. The directions are: In each row of numbers below, there is one that is wrong.

Find this wrong number among the answer numbers on the right and write its letter on the line to the right. In Sample A, the wrong number is 9, so letter b is written on the line to the right. You will have just 5 minutes to do all the problems on this page. Read the directions at the middle of the page and follow them carefully. Ready, begin.

Ready, begin.

Allow 5 minutes.

Now turn your booklet over to Test 6.

#### TEST 6

The directions are: Work these problems on a blank sheet of paper. Write the letter of the answer on the line to the right. The correct answer for the first problem (0) is b. You will have ten minutes. Ready, begin.

Allow 10 minutes.

Now turn the page over to Test 7.

#### TEST 7

The directions are: Draw a line under the word which means the same or about the same as the first word. Write the number of this word on the line to the right. In Sample 0, the third word, flower, has a line drawn under it because it means the same as blossom. A 3 is written on the line to the right. Do the others on the page in the same way. You will have ten minutes. Ready, begin.

Allow 10 minutes. Then say: STOP.

Turn your booklet over,—front cover up.

Collect separately the booklets and all extra sheets of paper.

(Unless the extra sheets of paper are collected, examinees are afforded an opportunity to carry away test items or other information, thus tending to render the test invalid for further use with these examinees.

### IX. DIRECTIONS FOR GIVING AS A SELF-ADMINISTERING TEST

The examiner should be familiar with the instructions, the sample exercises, and the method of recording responses by underlining and writing the number (or letter) of the response on the line to the right.

The procedure is to read aloud to the examinee or group the "Directions" printed at the top of each test page, and then call attention to the correct response in the sample. This response includes both underlining the answer and recording its number (or letter) on the line to the right. The examiner should proceed with reasonable speed from page to page, allowing just suf-

ficient time for examinees to understand the directions and apply them to the sample.

The Intermediate test samples are correctly solved as follows: Tests 1, 4, 5, 6, and 7 as indicated; for Test 2, No. 4 is correct; for Test 3, No. 4 is correct.

After this explanation, examinees are instructed to begin with Test 1 and proceed with all other tests, working as rapidly as possible without making mistakes until they have finished the booklet or have done as much of each test as they can.

Tell all examinees that the test is ordinarily completed in one period.

### X. DIRECTIONS FOR SCORING

The examiner should use the key which is furnished with the tests as an aid in scoring. It is advisable that the examiner take the test, or carefully examine the responses made by an examinee in order to become acquainted with the test situations.

Proceed as follows:

1. In scoring the tests, each item is considered right or wrong. No partial credits are given.
2. Mark each correct item with a "C." If two or more answers are given count as wrong, unless the examinee has attempted to erase, cross out, or otherwise indicate his intention.
3. Examinees are not penalized if they fail to record the number of the test item, as this is simply an aid in scoring. Consider the examinee's intention if that can be determined. If doubtful, score it "wrong."
4. The score for each test section is the number right.
5. Record the number right at the bottom of each test.
6. Transfer the score to the space provided on the front page of the test booklet.

### XI. INSTRUCTIONS FOR RECORDING TEST RESULTS

On Front Cover Page of Test Booklet and on the Reverse of Machine-scoring Answer Sheet

#### Purpose

The front cover page of the test booklet is designed to furnish a record of test results which may be torn from the test booklet and kept as a permanent record. For similar reasons, this cover page has been printed on the reverse of the machine-scoring answer sheet. It provides a Summary of the essential information and a Diagnostic Profile as an aid in interpreting test data.

# PERCENTILE AND DECILE NORMS

for use with

CALIFORNIA TEST OF MENTAL MATURITY  
NEW CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY  
CALIFORNIA CAPACITY QUESTIONNAIRE

## PERCENTILE RANK OF I. Q.'s FOR VARIOUS POPULATIONS

(For use with Language, Non-Language, and Total Score Data)

Percentiles .....	1	5	10	20	25	30	40	50	60	70	75	80	90	95	99	Median	S.D.
<b>Normal Population</b>																	
I.Q.'s ..... (N=100,000)	64-	65- 76	77- 82	83- 86	87- 88	89- 92	93- 97	98- 102	103- 107	108- 111	112- 113	114- 117	118- 123	124- 135	136+	100.0	16.0
<b>Ninth Grade I.Q.'s....</b> (N=25,000)	65-	66- 77	78- 86	87- 89	90- 91	92- 93	94- 98	99- 103	104- 108	109- 112	113- 114	115- 118	119- 123	124- 135	136+	101.5	15.5
<b>Tenth Grade I.Q.'s....</b> (N=25,000)	67-	68- 78	79- 87	88- 90	91- 92	93- 94	95- 99	100- 104	105- 109	110- 113	114- 115	116- 119	120- 124	125- 136	137+	103.0	15.5
<b>Eleventh Grade</b>																	
I.Q.'s ..... (N=25,000)	69-	70- 79	80- 88	89- 91	92- 93	94- 95	96- 100	101- 105	106- 110	111- 114	115- 116	117- 120	121- 126	127- 137	138+	104.0	15.5
<b>Twelfth Grade I.Q.'s</b> 72- (N=25,000)	73- 80	74- 81	75- 82	76- 83	77- 84	78- 85	79- 86	80- 87	81- 88	82- 89	83- 90	84- 91	85- 92	86- 93	87- 94	88+	90.0
<b>College Freshman</b>																	
I.Q.'s ..... (N=15,000)	87-	88- 93	94- 98	99- 100	101- 102	103- 104	105- 108	109- 112	113- 117	118- 121	122- 123	124- 127	128- 134	135- 147	148+	110.0	14.0
<b>Coll. Graduate</b>																	
I.Q.'s ..... (N=2,000)	99-	100- 107	108- 112	113- 115	116- 117	118- 120	121- 123	124- 126	127- 129	130- 132	133- 134	135- 137	138- 145	146- 155	156+	125.0	12.0

NOTE: If the user desires to eliminate the 25 and 75 percentiles in his distributions, assign the lower I.Q. of each to the 20 or 70 percentile interval, and assign the higher I.Q. of each to the 30 or 80 percentile interval. For example, in the Normal Population I.Q. group, the I.Q.'s of the 20%ile would become 83-87, and those of the 30%ile would become 88-92.

SPECIAL NOTE: A percentile may be described as a point on a 100 point scale which gives the per cent of I.Q.'s which fall below that particular percentile. For example, an individual whose I.Q. falls at the 70 percentile point exceeds 70 per cent of the population on whom the test was standardized; also, such an I.Q. may be interpreted to mean that this person's I.Q. is lower than 30 per cent of the other I.Q.'s in the standardization group. For convenience of interpretation, all I.Q.'s are assigned the percentile ranks of the percentile points nearest to which they are located. For example, in Normal Population I.Q.'s above, all I.Q.'s from 108 to 111 inclusive are assigned a percentile rank of 70.

## I. Q. DECILES for the CALIFORNIA TEST OF MENTAL MATURITY

Deciles:	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Median
<b>Normal Population I.Q.'s:</b> .....	79-	80- 85	86- 90	91- 95	96- 99	100-104	105-109	110-114	115-120	121+	100.0
<b>Ninth Grade I.Q.'s:</b> .....	82-	83- 88	89- 92	93- 97	98-101	102-106	107-111	112-116	117-122	123+	101.5
<b>Tenth Grade I.Q.'s:</b> .....	83-	84- 89	90- 93	94- 98	99-102	103-107	108-112	113-117	118-123	124+	103.0
<b>Eleventh Grade I.Q.'s:</b> .....	84-	85- 89	90- 94	95- 99	100-103	104-108	109-113	114-118	119-124	125+	104.0
<b>Twelfth Grade I.Q.'s:</b> .....	85-	86- 90	91- 95	96- 99	100-104	105-109	110-114	115-119	120-125	126+	105.0
<b>College Freshman I.Q.'s:</b> .....	95-	96-100	101-103	104-106	107-110	111-115	116-120	121-125	126-131	132+	110.0

NOTE: Decile ratings for the "normal population" group are recommended for use in all cases, except where a rating is to be made for comparison with pupils of a given educational level.

**Devised by Elizabeth T. Sullivan, Willis W. Clark, and Ernest W. Tiegs**

Name Mary Smith Occupation or Grade L9 (9.1)  
Date August 8 Age 14 Birthday Sept 10 Sex: Mc  
Instructor or Examiner Miss Bacon Business or Institution Park School

### \*Non-Language Tests

SUMMARY OF DATA	Score	M. A.	÷	C. A.*	=	I. Q.
Total Mental Factors . . .	<u>71</u>	<u>168</u>		<u>179</u>		<u>94</u>
Language Factors . . .	<u>35</u>	<u>160</u>		<u>179</u>		<u>89</u>
Non-Language Factors . . .	<u>36</u>	<u>181</u>		<u>179</u>		<u>101</u>

\* Age 16 and older, divide by 192 months.

Method

- 1. Record the examinee's Score for each of tests 1 to 6 on the light-face rule immediately to the right of the Possible Score in each case. Test 7, Vocabulary is recorded on the heavy-face line.
- 2. Add the score on tests 1 and 2 and write this sum on the heavy-face rule to the right of Spatial Relationships.
- 3. Add the scores on tests 3 and 4, and write this sum on the heavy-face rule to the right of Logical Reasoning.
- 4. Add the scores on tests 5 and 6, and write the sum on the heavy-face rule to the right of Numerical Reasoning.
- 5. To obtain the Total Mental Factors score, add the totals for Spatial Relationships, Logical Reasoning, Numerical Reasoning, and the Vocabulary score. Record this sum on the heavy rule to the right of Possible Score 145.
- 6. To obtain the Language Factors score, add the scores on Tests 4, 6, and 7, and write this sum on the heavy rule to the right of Possible Score 80.
- 7. To obtain the Non-Language Factors score, add the scores on Tests 1, 2, 3, and 5, and write this sum on the heavy rule to the right of Possible Score 65.
- 8. Chronological Age (C.A.) is the actual or life age of the examinee in months. It is essential that this age be correct for the purpose of calculating the I.Q.'s. (In all cases where the examinee is 16 years of age or older, 192 months is used as the divisor in obtaining I.Q.'s. However, each examinee's correct age is recorded on the line to the right of Chronological Age.) The age should be determined from the examinee's birth certificate, school records, or some other source, if these are doubtful.
- \*9. Actual Grade Placement is the grade in which an examinee is actually working at the time he takes the test, expressed as a fraction of a school year. It is determined by adding the decimal fractions of the school year to the examinee's grade assignment.

	B (Low)	A (High)
September or February.....	.0	.5
October or March.....	.1	.6
November or April.....	.2	.7
December or May.....	.3	.8
January or June.....	.4	.9

Thus an L10 student in January is 10.4; an H8 student in May is 8.8.

- 10. The Mental Ages (M.A.'s) are found by using

\* Ignore this paragraph when testing adults.

the norms on the last page of the Manual of Directions in the following manner: To find Mental Age for Total Mental Factors, find the third column from the left and follow it until you reach the score which corresponds to the value of the examinee's Score for Total Mental Factors; the corresponding Mental Age in months is found directly to the left in the first column. Mental Ages for Language Factors and Non-Language Factors are found similarly by locating the examinee's Scores in the 4th and 5th columns from the left and reading the corresponding Mental Ages in months in the first column.

11. Quotient data,<sup>1</sup> or intelligence quotients (I.Q.'s) are found by dividing each of the three Mental Ages (M.A.'s in months) by the examinee's Chronological Age (C.A. in months). However, for all individuals 16 years of age or older, 192 months is used as the divisor. I.Q.'s for those who are 16 years of age or older may be read from the last column on the right of the table of norms on page 16 of this Manual.

12. The Diagnostic Profile presents graphically evidences of the maturity or development of each examinee in the specific factors previously discussed. It is easily completed by locating examinee M.A.'s and other data on the light and heavy rule scales.

Interpretation of Profile

The authors of the *New California Short-Form Test of Mental Maturity* believe that these test data and the method of their presentation on this cover-page provide several significant advantages. Among these are the following:

- 1. It visualizes significant elements of examinee responses.
- 2. It analyzes and summarizes the major factors which are measured by the test situations.
- 3. As a professional device for the use of educators, it reduces the "mystery" which has surrounded the meaning of Mental Age and Intelligence Quotient. The examiner may readily note strengths and weaknesses of examinee responses in the various situations which together provide a measure of mental capacity.

In the interpretation of responses for individual examinees on the various tests, the examiner is referred to the detailed description of the tests which appear as Sections VI on page 3 of this Manual.

<sup>1</sup> The work of calculating I.Q.'s has been done for the convenience of test users in the *Age and I.Q. Calculator*, Los Angeles: California Test Bureau, 1945. Price \$1.00.

# PERCENTILE NORMS FOR SCORES OF VARIOUS MENTAL FACTORS

FOR USE WITH THE

## NEW CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY

### Intermediate '47 S-Form Series

**SPECIAL NOTE:** A percentile may be described as a point on a 100 point scale which gives the per cent of scores which fall below that particular percentile. For example, an individual whose score falls at the 70 percentile point exceeds 70 per cent of the population on whom the test was standardized; also, such a score may be interpreted to mean that this person is lower than 30 per cent of the other individuals in the standardization group. For convenience in interpretation, all scores are assigned the percentile ranks of the percentile points nearest to which they are located. For example, in the Table for Age 12-0 to 12-11 at the middle of this page, all **TOTAL MENTAL FACTORS** scores from 65 to 70 inclusive are assigned a percentile rank of 70.

**TABLE FOR AGE 11-0 to 11-11**

MENTAL FACTORS	Percentile Norms												
	1	5	10	20	30	40	50	60	70	80	90	95	99
Spatial Relationships (Tests 1 and 2)	0- 6	7- 8	9-10	11-12	13-14	15-16	17-18	19	20-21	22	23	24	25+
Logical Reasoning (Tests 3 and 4)	0	1	2- 3	4	5- 6	7- 8	9	10-11	12	13-14	15	16	17+
Numerical Reasoning (Tests 5 and 6)	0	....	1	2	3	4	5	6	7	8	9-10	11-13	14+
Vocabulary (Test 7)	0- 1	2	3	4- 5	6- 7	8- 9	10-11	12-14	15-18	19-23	24-28	29-34	35+
TOTAL MENTAL FACTORS	0-10	11-16	17-23	24-31	32-38	39-45	46-52	53-58	59-64	65-70	71-76	77-87	88+
Language Factors (Tests 4, 6, and 7)	0- 2	3- 6	7-10	11-14	15-18	19-23	24-27	28-31	32-34	35-38	39-41	42-49	50+
Non-Language Factors (Tests 1, 2, 3, and 5)	0- 8	9-11	12-14	15-16	17-19	20-22	23-25	26-27	28-29	30-31	32-34	35-38	39+
	1	5	10	20	30	40	50	60	70	80	90	95	99
	Percentile Norms												

**TABLE FOR AGE 12-0 to 12-11**

MENTAL FACTORS	Percentile Norms												
	1	5	10	20	30	40	50	60	70	80	90	95	99
Spatial Relationships (Tests 1 and 2)	0- 7	8-11	12-13	14-15	16-17	18-19	20	21	22	23	24	25-26	27+
Logical Reasoning (Tests 3 and 4)	0- 1	2- 3	4- 5	6- 7	8- 9	10-11	12	13	14	15	16-17	18-20	21+
Numerical Reasoning (Tests 5 and 6)	0	1	2	3	4	5	6	7	8	9-10	11-12	13-16	17+
Vocabulary (Test 7)	0- 2	3- 4	5- 6	7- 8	9-10	11-12	13-15	16-19	20-23	24-27	28-32	33-38	39+
TOTAL MENTAL FACTORS	0-14	15-26	27-34	35-41	42-48	49-54	55-59	60-64	65-70	71-76	77-83	84-94	95+
Language Factors (Tests 4, 6, and 7)	0- 4	5-12	13-16	17-21	22-25	26-28	29-31	32-34	35-38	39-42	43-46	47-53	54+
Non-Language Factors (Tests 1, 2, 3, and 5)	0-10	11-14	15-17	18-20	21-23	24-26	27-28	29-30	31-32	33-34	35-36	37-41	42+
	1	5	10	20	30	40	50	60	70	80	90	95	99
	Percentile Norms												

**TABLE FOR AGE 13-0 to 13-11**

MENTAL FACTORS	Percentile Norms													
	1	5	10	20	30	40	50	60	70	80	90	95	99	
Spatial Relationships (Tests 1 and 2)	0- 9	10-13	14-15	16-17	18-19	20-21	22	23	24	25	26	27-28	29+	
Logical Reasoning (Tests 3 and 4)	0- 3	4- 6	7- 8	9-10	11	12-13	14	15	16	17-18	19-20	21-22	23+	
Numerical Reasoning (Tests 5 and 6)	0- 1	2	3	4	5- 6	7	8	9	10-11	12-13	14-15	16-19	20+	
Vocabulary (Test 7)	0- 3	4- 6	7- 9	10-12	13-15	16-18	19-22	23-26	27-30	31-34	35-37	38-42	43+	
TOTAL MENTAL FACTORS	0-20	21-34	35-45	46-51	52-57	58-63	64-68	69-74	75-80	81-86	87-93	94-106	107+	
Language Factors (Tests 4, 6, and 7)	0- 7	8-15	16-23	24-27	28-30	31-34	35-37	38-40	41-44	45-48	49-52	53-58	59+	
Non-Language Factors (Tests 1, 2, 3, and 5)	0-13	14-17	18-22	23-24	25-27	28-29	30-31	32-33	34-35	36-38	39-41	42-47	48+	
	1	5	10	20	30	40	50	60	70	80	90	95	99	
	Percentile Norms													



# PERCENTILE NORMS FOR SCORES OF VARIOUS MENTAL FACTORS

FOR USE WITH THE

## NEW CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY

### Intermediate '47 S-Form Series

TABLE FOR AGE 14-0 to 14-11

MENTAL FACTORS	Percentile Norms												
	1	5	10	20	30	40	50	60	70	80	90	95	99
Spatial Relationships (Tests 1 and 2)	0-11	12-15	16-18	19	20-21	22-23	24	25	26	27	28	29	30+
Logical Reasoning (Tests 3 and 4)	0- 4	5- 7	8- 9	10-11	12-13	14	15-16	17-18	19	20	21- 22	23- 24	25+
Numerical Reasoning (Tests 5 and 6)	0- 2	3	4	5- 6	7	8	9-10	11	12-14	15-17	18- 20	21- 23	24+
Vocabulary (Test 7)	0- 4	5- 9	10-12	13-16	17-20	21-24	25-28	29-32	33-35	36-38	39- 41	42- 44	45+
TOTAL MENTAL FACTORS	0-33	34-43	44-52	53-58	59-64	65-70	71-76	77-83	84-89	90-95	96-103	104-117	118+
Language Factors (Tests 4, 6, and 7)	0-15	16-21	22-27	28-31	32-34	35-38	39-42	43-46	47-50	51-53	54- 57	58- 64	65+
Non-Language Factors (Tests 1, 2, 3, and 5)	0-17	18-21	22-25	26-27	28-29	30-32	33-34	35-36	37-38	39-41	42- 45	46- 52	53+
	Percentile Norms												
	1	5	10	20	30	40	50	60	70	80	90	95	99

TABLE FOR AGE 15-0 to 15-11

MENTAL FACTORS	Percentile Norms												
	1	5	10	20	30	40	50	60	70	80	90	95	99
Spatial Relationships (Tests 1 and 2)	0-13	14-18	19-20	21	22-23	24	25	26	27	28	29	30	31+
Logical Reasoning (Tests 3 and 4)	0- 5	6-10	11-12	13-14	15	16-17	18	19-20	21-22	23	24	25	26+
Numerical Reasoning (Tests 5 and 6)	0- 2	3- 4	5- 6	7- 8	9	10-11	12-13	14-15	16-18	19- 20	21- 22	23	24+
Vocabulary (Test 7)	0- 5	6-12	13-17	18-22	23-27	28-31	32-34	35-37	38-39	40- 41	42- 44	45- 47	48+
TOTAL MENTAL FACTORS	0-36	37-52	53-60	61-67	68-74	75-81	82-87	88-93	94-99	100-106	105-114	115-122	123+
Language Factors (Tests 4, 6, and 7)	0-17	18-26	27-32	33-36	37-40	41-45	46-49	50-52	53-55	56- 59	60- 63	64- 67	68+
Non-Language Factors (Tests 1, 2, 3, and 5)	0-19	20-25	25-28	29-31	32-33	34-36	37-38	39-41	42-44	45- 47	48- 51	52- 54	55+
	Percentile Norms												
	1	5	10	20	30	40	50	60	70	80	90	95	99

TABLE FOR 16 YEARS (and over, incl. ADULTS)

MENTAL FACTORS	Percentile Norms												
	1	5	10	20	30	40	50	60	70	80	90	95	99
Spatial Relationships (Tests 1 and 2)	0-14	15-19	20-21	22	23-24	25-26	27	28	29	30	31	32	33+
Logical Reasoning (Tests 3 and 4)	0- 6	7-11	12-13	14	15-16	17	18-19	20-21	22- 23	24	25	26	27+
Numerical Reasoning (Tests 5 and 6)	0- 3	4- 5	6	7- 8	9-10	11-12	13-14	15-17	18- 19	20- 21	22- 23	24- 25	26+
Vocabulary (Test 7)	0- 7	8-13	14-19	20-24	25-29	30-33	34-36	37-38	39- 41	42- 43	44- 45	46- 48	49+
TOTAL MENTAL FACTORS	0-38	39-55	56-62	63-71	72-78	79-84	85-90	91-96	97-103	104-110	111-117	118-125	126+
Language Factors (Tests 4, 6, and 7)	0-18	19-28	29-33	34-38	39-43	44-47	48-50	51-53	54- 57	58- 61	62- 65	66- 69	70+
Non-Language Factors (Tests 1, 2, 3, and 5)	0-19	20-26	27-29	30-32	33-35	36-37	38-39	40-42	43- 45	46- 49	50- 52	53- 56	57+
	Percentile Norms												
	1	5	10	20	30	40	50	60	70	80	90	95	99

# XII. INTERMEDIATE 1947 EDITION S-FORM NORMS

MENTAL AGE		Total	Language	Non-	Grade	I.Q. for	MENTAL AGE		Total	Language	Non-	Grade	I.Q. for
Month	Yr.-Mo.	Mental	Factors	Language	Place-	age 16	Month	Yr.-Mo.	Mental	Factors	Language	Place-	age 16
		Factors		Factors	ment	and			Factors		Factors	ment	and
						older							older
96	8- 0	15	4	11	2.6	50	183	15- 3	82	46	---	10.0	95
97	8- 1	16	5	---	2.7	50	184	15- 4	83	---	---	10.1	96
98	8- 2	17	---	12	2.8	51	185	15- 5	84	47	37	10.1	96
100	8- 4	18	6	---	2.9	52	186	15- 6	85	---	---	10.2	97
101	8- 5	19	---	---	3.0	53	187	15- 7	86	48	---	10.3	97
102	8- 6	20	7	13	3.1	53	189	15- 9	87	49	38	10.5	98
103	8- 7	21	8	---	3.2	54	190	15-10	---	---	---	10.6	99
105	8- 9	22	---	14	3.3	55	191	15-11	88	50	---	10.7	99
106	8-10	23	9	---	3.4	55	192	16- 0	89	---	---	10.8	100
107	8-11	24	---	---	3.5	56	194	16- 2	90	51	39	10.9	101
108	9- 0	25	10	15	3.6	56	195	16- 3	91	---	---	11.0	102
110	9- 2	26	11	---	3.8	57	197	16- 5	92	52	40	11.2	103
111	9- 3	27	---	16	3.8	58	199	16- 7	93	---	---	11.4	104
112	9- 4	28	12	---	3.9	58	200	16- 8	94	53	41	11.5	104
114	9- 6	29	13	---	4.1	59	202	16-10	95	---	---	11.7	105
115	9- 7	30	---	17	4.2	60	203	16-11	96	54	42	11.8	106
116	9- 8	31	14	---	4.2	60	205	17- 1	97	---	43	11.9	107
118	9-10	32	15	---	4.4	61	206	17- 2	98	55	---	12.0	107
119	9-11	33	---	18	4.5	62	208	17- 4	99	---	44	12.2	108
120	10- 0	34	16	---	4.6	62	209	17- 5	100	56	---	12.3	109
122	10- 2	35	17	---	4.7	63	211	17- 7	101	---	---	12.4	110
123	10- 3	36	---	19	4.8	64	212	17- 8	102	57	45	12.5	110
124	10- 4	37	18	---	4.8	65	213	17- 9	103	---	---	12.5	111
125	10- 5	38	---	---	4.9	65	215	17-11	104	58	46	12.7	112
126	10- 6	39	19	20	5.0	66	216	18- 0	105	---	---	12.8	112
127	10- 7	40	---	---	5.1	66	218	18- 2	106	59	47	12.9	113
128	10- 8	41	20	---	5.2	67	219	18- 3	---	---	---	13.0	114
130	10-10	42	21	21	5.3	68	220	18- 4	107	---	48	13.1	115
131	10-11	43	---	---	5.4	68	221	18- 5	108	60	---	13.2	115
132	11- 0	44	22	22	5.5	69	223	18- 7	109	---	---	13.3	116
134	11- 2	45	23	---	5.6	70	224	18- 8	110	61	49	13.4	117
136	11- 4	46	24	23	5.8	71	226	18-10	111	---	---	13.5	118
137	11- 5	47	---	---	5.8	71	227	18-11	112	62	50	13.6	118
138	11- 6	48	25	---	5.9	72	229	19- 1	113	---	51	13.8	119
139	11- 7	49	---	24	6.0	72	230	19- 2	114	63	---	13.9	120
140	11- 8	50	26	---	6.1	73	231	19- 3	115	---	---	14.0	120
142	11-10	51	27	---	6.2	74	233	19- 5	116	64	52	14.2	121
143	11-11	52	---	25	6.3	74	235	19- 7	117	---	---	14.4	122
145	12- 1	53	28	---	6.5	75	236	19- 8	118	65	53	14.5	123
146	12- 2	54	---	26	6.6	76	238	19-10	119	---	---	14.7	124
147	12- 3	55	29	---	6.6	77	239	19-11	120	66	---	14.8	124
148	12- 4	---	---	---	6.7	77	240	20- 0	121	---	---	14.9	125
149	12- 5	56	30	---	6.8	78	242	20- 2	122	67	54	15.1	126
150	12- 6	57	---	27	6.9	78	245	20- 5	123	68	55	15.4	128
151	12- 7	58	31	---	6.9	79	246	20- 6	124	---	---	15.5	128
153	12- 9	59	32	28	7.1	80	248	20- 8	125	69	56	15.7	129
154	12-10	60	---	---	7.2	80	250	20-10	126	---	---	16.0	130
155	12-11	61	33	---	7.3	81	251	20-11	---	70	---	16.1	131
157	13- 1	62	---	29	7.5	82	252	21- 0	127	---	---	16.2	131
158	13- 2	63	34	---	7.6	82	254	21- 2	128	71	57	16.4	132
159	13- 3	64	---	30	7.7	83	255	21- 3	129	---	---	16.5	133
160	13- 4	---	35	---	7.8	83	257	21- 5	130	72	58	---	134
161	13- 5	65	---	---	7.9	84	260	21- 8	131	---	---	---	135
162	13- 6	66	36	---	8.0	84	261	21- 9	132	73	59	---	136
163	13- 7	67	---	31	8.1	85	264	22- 0	133	---	---	---	137
165	13- 9	68	37	---	8.3	86	266	22- 2	134	74	60	---	138
166	13-10	69	---	---	8.4	86	269	22- 5	135	75	---	---	140
167	13-11	70	38	32	8.5	87	271	22- 7	136	---	---	---	141
168	14- 0	71	---	---	8.6	87	274	22-10	137	76	61	---	143
169	14- 1	72	39	33	8.7	88	276	23- 0	138	---	---	---	144
171	14- 3	73	40	---	8.8	89	280	23- 4	139	77	62	---	146
172	14- 4	74	---	---	8.9	90	284	23- 8	140	---	63	---	148
173	14- 5	75	41	34	9.0	90	287	23-11	141	78	---	---	149
175	14- 7	76	42	---	9.2	91	290	24- 2	142	---	---	---	151
176	14- 8	77	---	---	9.3	92	292	24- 4	---	---	---	---	152
177	14- 9	78	43	35	9.4	92	294	24- 6	143	79	64	---	153
179	14-11	79	44	---	9.6	93	300	25- 0	144	80	---	---	156
180	15- 0	80	---	---	9.7	94	308	25- 8	145	---	65	---	160
181	15- 1	81	45	36	9.8	94							

Devised by Louis P. Thorpe, Ernest W. Tiegs, and Willis W. Clark

**Teacher**..... **Date**.....

**PERCENTILE**  
(Chart pupil's percentile rank here)

**F. Nervous Symptoms . . .** 12 \_\_\_\_\_ |-----|-----|-----|-----|-----|-----|-----|-----|  
 (Freedom from)

**F. Community Relations . . 12** \_\_\_\_\_ |-----|-----|-----|-----|-----|-----|-----|-----|-----|

**PERCENTILE**

## INSTRUCTIONS TO PUPILS

After each of the following questions, make a circle around the **YES** or **NO**.  
 For example, if you have a dog at home make a circle around the **YES**. Do the other  
 A. Do you have a dog at home? **YES NO**  
 B. Can you ride a bicycle? **YES NO**

On the next pages are more questions.  
 The answers are not right or wrong, but show what you think, how you feel, or what you do about things.  
 Go right on from one page to another until you have finished all of them.

## INTERESTS AND ACTIVITIES

First look at each thing in this test. Make a circle around the **L** for each thing that you like or would very much like to do. Then make a circle around the **D** for things you really do.

- |                                  |                                   |                                      |
|----------------------------------|-----------------------------------|--------------------------------------|
| 1. <b>L D</b> Play the radio     | 27. <b>L D</b> Collect coins      | 51. <b>L D</b> Go to church          |
| 2. <b>L D</b> Read stories       | 28. <b>L D</b> Collect autographs | 52. <b>L D</b> Go to Sunday School   |
| 3. <b>L D</b> Go to movies       | 29. <b>L D</b> Collect pictures   | 53. <b>L D</b> Belong to a club      |
| 4. <b>L D</b> Study reading      | 30. <b>L D</b> Cut out pictures   | 54. <b>L D</b> Belong to YMCA        |
| 5. <b>L D</b> Study arithmetic   | 31. <b>L D</b> Practice writing   | or YWCA                              |
| 6. <b>L D</b> Study history      | 32. <b>L D</b> Sew                | 55. <b>L D</b> Go to parks           |
| 7. <b>L D</b> Study science      | 33. <b>L D</b> Knit               | 56. <b>L D</b> Go to a carnival      |
| 8. <b>L D</b> Study spelling     | 34. <b>L D</b> Make boats         | 57. <b>L D</b> Go to a circus        |
| 9. <b>L D</b> Study geography    | 35. <b>L D</b> Make airplanes     | 58. <b>L D</b> Sing in a chorus      |
| 10. <b>L D</b> Study trees       | 36. <b>L D</b> Use building toys  | 59. <b>L D</b> Sing in a glee club   |
| 11. <b>L D</b> Study birds       | 37. <b>L D</b> Work with tools    | 60. <b>L D</b> Belong to a gang      |
| 12. <b>L D</b> Study animals     | 38. <b>L D</b> Make a garden      | 61. <b>L D</b> Play ping pong        |
| 13. <b>L D</b> Study butterflies | 39. <b>L D</b> Play on sandpiles  | 62. <b>L D</b> Play croquet          |
| 14. <b>L D</b> Draw              | 40. <b>L D</b> Play with pets     | 63. <b>L D</b> Play ball             |
| 15. <b>L D</b> Paint             | 41. <b>L D</b> Visit rivers       | 64. <b>L D</b> Play tennis           |
| 16. <b>L D</b> Model             | 42. <b>L D</b> Go fishing         | 65. <b>L D</b> Go hunting            |
| 17. <b>L D</b> Design            | 43. <b>L D</b> Climb              | 66. <b>L D</b> Go hiking with a      |
| 18. <b>L D</b> Sing              | 44. <b>L D</b> Skate              | group                                |
| 19. <b>L D</b> Play piano        | 45. <b>L D</b> Ride a bicycle     | 67. <b>L D</b> Play in a band        |
| 20. <b>L D</b> Make a scrapbook  |                                   | 68. <b>L D</b> Play in an orchestra  |
| 21. <b>L D</b> Keep a diary      |                                   | 69. <b>L D</b> Go to a church social |
| 22. <b>L D</b> Write             | 46. <b>L D</b> Ride a horse       | 70. <b>L D</b> Go to a party         |
| 23. <b>L D</b> Speak pieces      | 47. <b>L D</b> Play cards         | 71. <b>L D</b> Go to a dance         |
| 24. <b>L D</b> Play a harmonica  | 48. <b>L D</b> Play dominoes      | 72. <b>L D</b> Be officer of a club  |
| 25. <b>L D</b> Take pictures     | 49. <b>L D</b> Play checkers      | 73. <b>L D</b> Belong to Scouts      |
| 26. <b>L D</b> Collect stamps    | 50. <b>L D</b> Play chess         | 74. <b>L D</b> Go camping            |

## SECTION 1 A

1. Would you rather plan your own work than to have some one else plan it for you? YES NO
2. Do you usually apologize when you are wrong? YES NO
3. When you have some free time, do you usually ask your parents or teachers what to do? YES NO
4. When someone tries to cheat you, do you usually try to stop him? YES NO
5. Is it easy for you to recite or talk in class? YES NO
6. Do you like to meet new people or introduce them to others? YES NO
7. Do you usually go to bed on time, even when you wish to stay up? YES NO
8. Is it hard to do your work when someone blames you for something? YES NO
9. Do you usually eat food that is good for you, even if you do not like it? YES NO
10. Do your parents or teachers usually need to tell you to do your work? YES NO
11. Do you get excited when things go wrong? YES NO
12. Do you usually keep at your work until it is done? YES NO

Score Section 1 A.....

## SECTION 1 B

13. Do your friends generally think that your ideas are good? YES NO
14. Do most of your friends and classmates think you are bright? YES NO
15. Are your friends and classmates usually interested in the things you do? YES NO
16. Do you wish that your father (or mother) had a better job? YES NO
17. Do your classmates seem to think that you are not a good friend? YES NO
18. Do your friends and classmates often want to help you? YES NO
19. Are you sometimes cheated when you trade things? YES NO
20. Do your classmates and friends usually feel that they know more than you do? YES NO
21. Do your folks seem to think that you are doing well? YES NO
22. Can you do most of the things you try? YES NO
23. Do people often think that you cannot do things very well? YES NO
24. Do people often do nice things for you? YES NO

Score Section 1 B.....

### SECTION 1 C

25. May you usually choose your own friends? YES NO
26. Are you allowed enough time to play? YES NO
27. Do others usually decide to which parties you may go? YES NO
28. May you usually bring your friends home when you want to? YES NO
29. May you usually do what you want to during your spare time? YES NO
30. Do you have a chance to see many new things? YES NO
31. Do your folks often stop you from going around with your friends? YES NO
32. Are you allowed to do most of of the things you want to? YES NO
33. Are you given some spending money? YES NO
34. Do your folks stop you from taking short walks with your friends? YES NO
35. Are you punished for lots of little things? YES NO
36. Do you feel that your folks boss you too much? YES NO

Score Section 1 C.....

### SECTION 1 D

37. Do pets and animals make friends with you easily? YES NO
38. Are you proud of your school? YES NO
39. Do your classmates think you cannot do well in school? YES NO
40. Are you as well and strong as most boys and girls? YES NO
41. Are your cousins, aunts, uncles, or grandparents as nice as those of most of your friends? YES NO
42. Are the members of your family usually good to you? YES NO
43. Do you often think that nobody likes you? YES NO
44. Do you feel that most of your classmates are glad that you are a member of the class? YES NO
45. Do you have just a few friends? YES NO
46. Do you often wish you had some other parents? YES NO
47. Are you sorry you live in the place you do? YES NO
48. Do your friends have better times at home than you do? YES NO

Score Section 1 D.....

## SECTION 1 E

49. Have people often been so unfair that you gave up? YES NO
50. Do you often think of many things that are dangerous? YES NO
51. Do you often meet people who are so mean that you hate them? YES NO
52. Do you often think about such things as failing in your studies, losing money, losing your parents, or dying? YES NO
53. Do your friends or your work often make you worry? YES NO
54. Is your work often so hard that you stop trying? YES NO
55. Are people often so unkind or unfair that it makes you feel bad? YES NO
56. Do your friends or classmates often say or do things that hurt your feelings? YES NO
57. Do people often try to cheat you or do mean things to you? YES NO
58. Are you often with people who have so little interest in you that you feel lonesome? YES NO
59. Are your studies or your life so dull that you often think about many other things? YES NO
60. Are people often mean or unfair to you? YES NO

Score Section 1 E.....

## SECTION 1 F

61. Do you often have sneezing spells? YES NO
62. Do you often have bad dreams? YES NO
63. Do you bite your fingernails often? YES NO
64. Does it usually take you a long time to go to sleep at night? YES NO
65. Does your head ache often? YES NO
66. Do you often find you are not hungry at meal time? YES NO
67. Do you take cold easily? YES NO
68. Do you often feel tired in the forenoon? YES NO
69. Do you often tap with your fingers on a table or desk? YES NO
70. Do you often feel sick at your stomach? YES NO
71. Do you often have dizzy spells? YES NO
72. Do your eyes hurt you often? YES NO

Score Section 1 F.....

## SECTION 2 A

73. When people get sick or are in trouble, is it usually their own fault? YES NO
74. Is it all right to disobey teachers if you think they are not fair to you? YES NO
75. Should only the older boys and girls be nice and friendly to new people? YES NO
76. Is it all right to take things you need if you have no money? YES NO
77. Is it necessary to thank those who have helped you? YES NO
78. Do children need to obey their fathers or mothers even when their friends tell them not to? YES NO
79. If a person finds something, does he have a right to keep it or sell it? YES NO
80. Is it all right to make fun of boys and girls who do not believe what you do? YES NO
81. Should children obey signs that tell them to stay off of other peoples' grounds? YES NO
82. Should children be nice to people they don't like? YES NO
83. Is it all right for children to cry or whine when their parents keep them home from a show? YES NO
84. Is it all right to cheat in a game when the umpire is not looking? YES NO

Score Section 2 A.....

## SECTION 2 B

85. Do you like to speak or sing before other people? YES NO
86. When people make you angry do you usually keep it to yourself? YES NO
87. Do you help new pupils to talk to other children? YES NO
88. Does it make you feel angry when you lose in games at parties? YES NO
89. Is it hard for you to talk to people as soon as you meet them? YES NO
90. Do you usually help other boys and girls to have a good time? YES NO
91. Do you usually act friendly to people you do not like? YES NO
92. Do you often change your plans in order to help people? YES NO
93. Do you usually forget the names of people you meet? YES NO
94. Do you often say nice things to people when they do well? YES NO
95. Do you try games at parties even if you haven't played them before? YES NO
96. Do you talk to new children at school? YES NO

Score Section 2 B.....



## SECTION 2 C

97. Do people often ask you to do such hard or foolish things that you won't do them? YES NO
98. Are the tests at school often so hard or unfair that it is all right to cheat? YES NO
99. Do you often make friends or classmates do things they don't want to? YES NO
100. Are things sometimes so bad at school that you stay away? YES NO
101. Do people often act so badly that you have to be mean or nasty to them? YES NO
102. Do you often have to make a "fuss" or "act up" to get your rights? YES NO
103. Is anyone at school so mean that you tear, or cut, or break things? YES NO
104. Is it hard to make people remember how well you can do things? YES NO
105. Is someone at home so mean that you often have to quarrel? YES NO
106. Do you sometimes need something so badly that it is all right to take it? YES NO
107. Do classmates often quarrel with you? YES NO
108. Do you like to scare or push smaller boys and girls? YES NO

Score Section 2 C.....

## SECTION 2 D

109. Do you have a hard time because it seems that your folks hardly ever have enough money? YES NO
110. Do your folks seem to think that you are just as good as they are? YES NO
111. Are you unhappy because your folks do not care about the things you like? YES NO
112. When your folks make you mind are they usually nice to you about it? YES NO
113. Do your folks often claim that you are not as nice to them as you should be? YES NO
114. Do you like both of your parents about the same? YES NO
115. Does someone at home pick on you much of the time? YES NO
116. Does it seem to you that your folks at home often treat you mean? YES NO
117. Do you try to keep boys and girls away from your home because it isn't as nice as theirs? YES NO
118. Do you sometimes feel like running away from home? YES NO
119. Do you feel that no one at home loves you? YES NO
120. Have you often felt that your folks thought you would not amount to anything? YES NO

Score Section 2 D.....

## SECTION 2 E

121. Do you think that the boys and girls like you as well as they should? YES NO
122. Do you think that the children would be happier if the teacher were not so strict? YES NO
123. Is it fun to do nice things for some of the other boys and girls? YES NO
124. Is school work so hard that you are afraid you will fail? YES NO
125. Do many of the children get along with the teacher much better than you do? YES NO
126. Does it seem to you that some of the teachers have it in for pupils? YES NO
127. Do your schoolmates seem to think that you are nice to them? YES NO
128. Would you like to stay home from school a lot if it were right to do so? YES NO
129. Are most of the boys and girls at school so bad that you try to stay away from them? YES NO
130. Do your classmates choose you as often as they should when they play games? YES NO
131. Do many of the other boys or girls claim that they play games fairer than you do? YES NO
132. Do the boys and girls usually treat you nice at school? YES NO

Score Section 2 E.....

## SECTION 2 F

133. Do you visit many of the interesting places near where you live? YES NO
134. Do you sometimes do things to make the place in which you live look nicer? YES NO
135. Do you think there are too few interesting places near your home? YES NO
136. Do you ever help clean up things near your home? YES NO
137. Do you take good care of your own pets or help with other people's pets? YES NO
138. Do you sometimes help other people? YES NO
139. Do you try to get your friends to obey the laws? YES NO
140. Do you help children keep away from places where they might get sick? YES NO
141. Do you usually try to be nice to people who are not the same color or race as you are? YES NO
142. Is it all right to do what you please if the police are not around? YES NO
143. Does it make you glad to see the people around your house get along fine? YES NO
144. Do you dislike many of the people who live near your home? YES NO

Score Section 2 F.....

# CALIFORNIA TEST OF PERSONALITY

## Elementary Series, Form A, Answer Key

SEC. 1A	SEC. 1B	SEC. 1C	SEC. 1D	SEC. 1E	SEC. 1F	SEC. 2A	SEC. 2B	SEC. 2C	SEC. 2D	SEC. 2E	SEC. 2F
YES	13. YES	25. YES	37. YES	49. NO	61. NO	73. NO	85. YES	97. NO	109. NO	121. YES	133. YES
YES	14. YES	26. YES	38. YES	50. NO	62. NO	74. NO	86. YES	98. NO	110. YES	122. NO	134. YES
NO	15. YES	27. NO	39. NO	51. NO	63. NO	75. NO	87. YES	99. NO	111. NO	123. YES	135. NO
YES	16. NO	28. YES	40. YES	52. NO	64. NO	76. NO	88. NO	100. NO	112. YES	124. NO	136. YES
YES	17. NO	29. YES	41. YES	53. NO	65. NO	77. YES	89. NO	101. NO	113. NO	125. NO	137. YES
YES	18. YES	30. YES	42. YES	54. NO	66. NO	78. YES	90. YES	102. NO	114. YES	126. NO	138. YES
YES	19. NO	31. NO	43. NO	55. NO	67. NO	79. NO	91. YES	103. NO	115. NO	127. YES	139. YES
NO	20. NO	32. YES	44. YES	56. NO	68. NO	80. NO	92. YES	104. NO	116. NO	128. NO	140. YES
YES	21. YES	33. YES	45. NO	57. NO	69. NO	81. YES	93. NO	105. NO	117. NO	129. NO	141. YES
NO	22. YES	34. NO	46. NO	58. NO	70. NO	82. YES	94. YES	106. NO	118. NO	130. YES	142. NO
NO	23. NO	35. NO	47. NO	59. NO	71. NO	83. NO	95. YES	107. NO	119. NO	131. NO	143. YES
YES	24. YES	36. NO	48. NO	60. NO	72. NO	84. NO	96. YES	108. NO	120. NO	132. YES	144. NO

# MANUAL OF DIRECTIONS

## CALIFORNIA TEST OF PERSONALITY—ELEMENTARY SERIES

### A Profile of Personal and Social Adjustment

Devised by Louis P. Thorpe, Willis W. Clark, and Ernest W. Tiegs<sup>1</sup>

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#### Part I. Purpose of the Test

The California Test of Personality has been designed to identify and reveal the status of certain highly important factors in personality and social adjustment usually designated as *intangibles*. These are the factors that defy appraisal or diagnosis by means of ordinary ability and achievement tests. Measurements of capacity, skill, and achievement, important as they are, do not constitute a complete picture of a functioning personality. When the teacher has, in addition to the above, evidences of a child's characteristic modes of response in a variety of situations which vitally affect him as an individual or as a member of a group, she can use this more complete picture of his personality to guide him to better personal and social adjustment.

From one standpoint, use of the term *personality* is unfortunate. Personality is not something separate and apart from ability or achievement but includes them; it refers rather to the manner and effectiveness with which the whole individual meets his personal and social problems, and indirectly the manner in which he impresses his fellows. The individual's ability and past achievements are always an inevitable part of his current attempts to deal with his problems intelligently. Since tests of ability and achievement are already available, the term personality test (measure, inventory, or profile) has become attached to instruments for identifying and evaluating the more intangible elements of total complex patterns of feeling, thinking, and acting.

Insistence on respect for the "wholeness" of the adjusting organism or guidance of the whole child represents a major contribution of the modern movement in education. This personality test is an implement or tool through which the teacher can more easily and effectively approach this desirable goal.

Some of the distinctive features of the California Test of Personality may be stated as follows:

1. The major purpose of the test is to reveal the extent to which the pupil is adjusting to the problems and conditions which confront him and is developing a normal, happy, and socially effective personality.

<sup>1</sup>The authors take pleasure in acknowledging their indebtedness to Dr. Elizabeth T. Sullivan and Dr. Welty Lefever for suggestions made during the development of this Manual of Directions for teachers.

2. The test is divided into two sections. The purpose of Section 1 is to indicate how the pupil feels and thinks about himself, his self-reliance, his estimate of his own worth, his sense of personal freedom, and his feeling of belonging. In this section the pupil also reveals certain withdrawing and nervous tendencies which he may possess. Section 2 consists of social adjustment components. Its purpose is to show how the pupil functions as a social being, his knowledge of social standards, his social skills, his freedom from anti-social tendencies, and his family, school, and community relationships.

An evaluation of these components discloses whether or not the pupil's basic needs are satisfied in an atmosphere of security and whether he is developing a balanced sense of self-realization and social acceptance.

3. The diagnostic profile is so devised that it is possible to compare and contrast the adjustment patterns and habits of each pupil with the characteristic modes of response of large representative groups of similar pupils. The profile thus reveals graphically the points at which a particular pupil differs from desirable patterns of adjustment and which constitute the point of departure for guidance. No computations are necessary on the part of the teacher in completing the profile.

4. This test is based upon a study of over 1000 specific adjustment patterns or modes of response to specific situations which confront children of these ages. Many of these items had previously been validated by other workers. The items finally included in the two forms of the test were selected on the basis of:

- Judgments of teachers and principals regarding their relative validity and significance.
- The reactions of pupils, expressing the extent to which they felt competent and willing to give correct responses.
- A study of the extent to which pupil responses and teacher appraisals agreed.
- A study of the relative significance of items by means of the bi-serial  $r$  technique.

5. In harmony with the generally recognized importance of a well balanced personality, the profile is so devised as to reveal graphically when adjustment in various situations is satisfactory, when it departs significantly, and when characteristic patterns deviate so far from desirable adjustment that they indicate possible or actual danger.

## Part II. Nature of the Test

The California Test of Personality is a teaching-learning or development instrument primarily. Its purpose is to provide the data for aiding pupils to maintain or develop a sane balance between self and social adjustment. Pupil reactions to items are obtained, not primarily for the usefulness of total or section scores, *but to detect the areas and specific types of tendencies to think, feel, and act which re-*

*veal undesirable individual adjustments.*<sup>1</sup> Each group of related unsatisfactory responses becomes in a sense, therefore, a major objective of pupil guidance. Part IX of this Manual presents methods of classifying and treating such adjustment difficulties. *This is a unique feature of the test.*

The fact that exactly six sub-tests appear in each of the two sections of the test may erroneously suggest a purely arbitrary classification. Research began with sixteen components, some of which had been at least partially validated by other workers. Three of these components subsequently disappeared while two others were thrown together and treated as a single component, leaving twelve in all. The use of exactly twelve items in each component is partially arbitrary and resulted from the decision to develop a one-period instrument. However, the final selection of items in each component was based upon the relative sizes of their bi-serial  $r$ 's and the relative number of *yes*, *no*, and *omitted* responses which they received in the experimental try-out.

Although factor analysis studies of the data secured through the use of this test have been in progress for many months, the factors extracted represent a grouping of tendencies to act which vary considerably from the concepts which abound in the literature on personality and with which teachers are familiar.

From a practical operational standpoint arrived at through experimental tryouts of the test, it has seemed wise to retain familiar terminology in an organization of components based on logical analysis, experience, the judgments of workers in this field, and a considerable number of statistical studies.

Factor analysis and other statistical studies are still continuing in the hope that as the nature of these personality factors becomes better known to investigators and teachers alike, their component designations and profile organization may increasingly approach the realities which they seek to represent.

*(Continued on page four)*

<sup>1</sup> The authors desire to emphasize at this point that a response to a single item of the test abstracted from its component setting and its relationship to other components may be misleading. Neither should the significance of a single deviation from what is typical for the larger group be overemphasized. Such deviations must be interpreted in the light of the drives and urges which motivate them.

The authors are primarily interested in determining the seriousness of deviation from the group mores. They are not interested in measuring the extent to which such deviations represent internally consistent conduct on the part of students who are significantly out of step with the group mores or standards; most such deviations probably do represent definite attempts to maintain such consistency. The authors are interested rather in utilizing this factor of probable internal consistency in identifying the causes of deviation in behavior in order to provide a basis for guiding students to better adjustment.

The teacher need not be worried because this changing complex of tendencies to feel, think, and act cannot be defined in simple static terms, or because some traditional concepts of alleged traits must be abandoned. Neither need the teacher be perturbed because some of the concepts and techniques of the present instrument represent departures from those utilized in connection with ability and achievement tests. So long as the teacher can with reasonable success identify significant departures from typical adjustment patterns through the use of norms or group tendencies, and deal with them in terms of their most probable causes, philosophical arguments and debates can safely be left to those who are not so familiar with what happens in the classroom.

This problem has been emphasized in a comprehensive manner by Douglas Spencer in his *Fulcrum of Conflict*.

## ORGANIZATION OF THE CALIFORNIA TEST OF PERSONALITY

### LIFE ADJUSTMENT:

A balance  
between self and  
social adjustment

1. Self Adjustment: Based on  
feelings of personal security

2. Social Adjustment: Based on  
feelings of social security

A. Self-reliance  
B. Sense of Personal Worth  
C. Sense of Personal Freedom  
D. Feeling of Belonging  
E. Freedom from Withdrawing Tendencies  
F. Freedom from Nervous Symptoms

A. Social Standards  
B. Social Skills  
C. Freedom from Anti-social Tendencies  
D. Family Relations  
E. School Relations  
F. Community Relations

### BRIEF DEFINITIONS OF THE VARIOUS COMPONENTS<sup>1</sup>

**1A. Self-reliance**—A pupil may be said to be self-reliant when his actual actions indicate that he can do things independently of others, depend upon himself in various situations, and direct his own activities. The self-reliant boy or girl is also characteristically stable emotionally, and responsible in his behavior.

**1B. Sense of Personal Worth**—A pupil possesses a sense of being worthy when he feels he is well regarded by others, when he feels that others have faith in his future success, and when he believes that he has average or better than average ability. To feel worthy means to feel capable and reasonably attractive.

**1C. Sense of Personal Freedom**—A pupil enjoys a sense of freedom when he is permitted to have a reasonable share in the determination of his conduct and in setting the general policies that shall govern his life. Desirable freedom includes permission to choose one's own friends and to have at least a little spending money.

**1D. Feeling of Belonging**—A pupil feels that he belongs when he enjoys the love of his family, the well-wishes of good friends, and a cordial relationship with people in general. Such a pupil will as a rule get along well with his teachers and usually feels proud of his school.

**1E. Withdrawing Tendencies**—The pupil who is said to withdraw is the one who substitutes the joys of a fantasy world for actual successes in real life. Such a child is characteristically sensitive, lonely, and given to self-concern. Normal adjustment is characterized by reasonable freedom from these tendencies.

**1F. Nervous Symptoms**—The pupil who is classified as having nervous symptoms is the one who suffers from one or more of a variety of physical symptoms such as loss of appetite, frequent eye strain, inability to sleep, or a tendency to be chronically tired. Children of this kind may be exhibiting physical expressions of emotional conflicts.

**2A. Social Standards**—The pupil who recognizes desirable social standards is the one who has come to understand the rights of others and who appreciates the necessity of subordinating certain desires to the needs of the group. Such a pupil understands what is regarded as being right or wrong.

**2B. Social Skills**—A pupil may be said to be socially skillful or effective when he shows a liking for people, when he inconveniences himself to be of assistance to them, and when he is diplomatic in his dealings with both friends and strangers. The socially skillful boy or girl subordinates his or her egoistic tendencies in favor of interest in the problems and activities of his associates.

**2C. Anti-social Tendencies**—A pupil would normally be regarded as anti-social when he is given to bullying, frequent quarreling, disobedience, and destructiveness to property. The anti-social child is the one who endeavors to get his satisfactions in ways that are damaging and unfair to others. Normal adjustment is characterized by reasonable freedom from these tendencies.

**2D. Family Relations**—The pupil who exhibits desirable family relationships is the one who feels that he is loved and well-treated at home, and who has a sense of security and self-respect in connection with the various members of his family. Superior family relations also include parental control that is neither too strict nor too lenient.

**2E. School Relations**—The pupil who is satisfactorily adjusted to his school is the one who feels that his teachers like him, who enjoys playing with other children, and who finds the school work adapted to his level of interest and maturity. Good school relations involve the feeling on the part of the pupil that he counts for something in the life of the institution.

**2F. Community Relations**—The pupil who may be said to be making good adjustments in his community is the one who mingles happily with his neighbors, who takes pride in community improvements, and who is tolerant in dealing with both strangers and foreigners. Satisfactory community relations include as well the disposition to be respectful of laws and of regulations pertaining to the general welfare.

<sup>1</sup>The reader's attention is called to the fact that these components are not names for so-called general traits. They are, rather, names for groupings of more or less specific tendencies to feel, think, and act.

The differentiation of personality and social adjustment into twelve more or less well defined components as a basis for diagnosis and guidance represents, in itself, a wide departure as well as a significant challenge for teachers. Such a treatment should result in an increasingly sympathetic and intelligent handling of adjustment problems.

### Part III. Reliability

Certain outcomes such as knowledges, understandings, and skills, once attained, remain relatively stable and tests designed to reveal their presence may possess relatively high statistical reliability. The normal pupil, on the other hand, is a growing organism whose integration must be preserved while his feelings, convictions, and modes of behavior are changing in accordance with his experiences. Some of the items of this profile touch relatively sensitive personal and social areas, and such pupil attitudes may change in a relatively short time. For these and other reasons, the statistical reliability of instruments of this type will sometimes appear to be somewhat lower than that of good tests of ability and achievement.

However, the reliability of the California Test of Personality does not suffer by comparison with many widely used tests of mental ability and school achievement. The following correlations were obtained with 334 cases by the split-halves method corrected by the Spearman-Brown formula:

	<i>r</i>	<i>S.D. dist.</i>	<i>P.E. est.</i>
		<i>score</i>	<i>score</i>
Total Adjustment .....	.933	15.2	3.7
Sec. 1. Self Adjustment .888		9.9	3.1
Sec. 2. Social Adjustm't .867		7.6	2.6

The correlation between Section 1 and Section 2, .66, is sufficiently low to emphasize the desirability of studying the child from the standpoint of both self adjustment and social adjustment. The reliabilities of the component tests vary from .60 to .80 and are thus sufficiently high to locate more restricted areas of personality difficulty. After these areas have been located, the teacher may proceed to identify specific adjustment difficulties as indicated in Part IX.

### Part IV. Validity

The validity of any instrument is dependent not only upon its intrinsic nature but also upon the manner in which it is to be used. The latter point is an important consideration in the validation of instruments in the personality field. Among the factors of importance which are related to the validity of the present test are the following:

- A. Selection of Items
- B. The Personality Components
- C. Test Item Disguise
- D. Limitations

Each of these factors will receive brief consideration.

#### A. Selection of Items

Adequate selection of test items is, in general, the best guarantee of the validity of any testing instrument. Attention has already been called to the manner in which reactions of pupils, teachers, and principals, other tests, and statistical techniques were utilized in the process of validation of the California Test of Personality.

#### B. The Personality Components

The twelve components mentioned in Part I and presented in Part II of this Manual represent functionally related groups of crucial, specific evidences of personal or social adjustment; their names correspond to some of the most important present-day personality adjustment concepts which are vital to normal growth and development. The items of each component represent fundamental action patterns. The obtained correlations among components emphasize the unity or "wholeness" of normal individuals; as would be expected, these personality components are not mutually exclusive.

#### C. Test Item Disguise

The authors have been sensitive to the tendency of some children to paint self-portraits which are better than the originals. They have attempted to nullify the effects of these tendencies in two ways; namely, by disguising as many items as possible which might conflict with the child's tendency to protect himself, and by providing outside checking devices as indicated in Part X.

The authors do not ask, "Do you cheat?" but rather, "Are your tests so hard or unfair that it is all right to cheat?" They do not ask, "Do you quarrel or are you quarrelsome?" but, "Do your classmates quarrel with you?" Such disguised items do not tempt the child to detect their purpose by asking, "Do you exaggerate the seriousness of your illness?" but instead, ask, "Do you suffer more than most people when you are ill?"

In many such instances the facts about a child's adjustment are not as important as *the way he feels and what he believes concerning them*, since such beliefs and feelings are frequently the keys to his intimate personality status, as well as to his possible improvement.

#### D. Limitations

Practical considerations have limited the profile to one hundred and forty-four items. Many others might have been used to obtain a more complete sampling. However, it is possible that a careful selection of items has produced a relatively short instrument which is as reliable and useful as one of greater length.

Language difficulties may affect the usefulness of tests and personality profiles. In spite of the safeguards used, the present profile probably has not escaped the influence of this shortcoming. The differing points of view and attitudes of those who read

the test items will, no doubt, result in interpretations somewhat at variance from those intended. The varying language abilities of pupils may also produce discrepancies in understanding and response. Changing attitudes and a lack of self-knowledge are other problems which must be faced. However, the authors have evaluated the language of these profiles by means of the Lewerenz Vocabulary Grade Placement Formula, teacher reactions, and pupil responses, and have, in general, kept the language difficulties at the third grade level.

### Part V. The Integrated Personality

The authors wish to re-emphasize the desirability of interpreting and aiding the child in terms of an essential unity of function and adjustment. For this reason, interpretations of profile data should be made, and plans for personality improvement should be projected, not only in terms of the testimony of the profile itself, but also in terms of the factors that are operating to defeat adequate adjustment.

Mental deficiency or mental immaturity may be productive of many types of difficulties. Inability to read or to succeed in some other type of school activity may create conflicts which encourage the development of various kinds of defense mechanisms. These difficulties frequently first come to the attention of the teacher in such forms of behavior as negativism, daydreaming, ego-centrism or other unsatisfactory detours around the problems of a too complex educational environment. Many of the apparently physical difficulties of children have no observable physical basis whatsoever but may result from unsatisfactory childish efforts to solve conflicts which arise because school activities are not in harmony with their interests, needs, and capacities.

It is desirable, therefore, that after the profile has revealed specific evidences of difficulty, the teacher view the whole child in his total environment, as far as possible, before selecting and using the types of remedial activities described in Part IX of this Manual.

### Part VI. Directions for Administering

The pupil responses secured in this test are designed to furnish diagnostic information regarding various elements of personality and social adjustment. It will be noted that, beginning on page 3, there are twelve sections with a total of 144 questions. There is a list of interests and activities on page 2 of the booklet regarding which the pupils are to indicate the things they like and the things they do.

There is no time limit for the responses and pupils should be permitted to answer all items. Ordinarily the responses may be given in one class period of 45 minutes.

Pupils should have lead pencils and a test booklet. Directions to be given pupils are in black type.

After identifying data are recorded on the front page, state: **Open your booklet and fold back the**

**page to page 2.** (Ignore Interests and Activities for the present. Demonstrate and be sure that pupils have found page 2.)

Now look at the bottom where it says: "Instructions to Pupils." After each of the following questions, put a circle around the YES or NO. (Illustrate circle on blackboard if necessary.) Do you have a dog at home? Put a circle around the YES or the NO. Now answer the other question by putting a circle around the YES or NO.

On the next pages are more questions. The answers are not right or wrong, but show what you think, how you feel, or what you do about things.

Go right on from one page to another until you have finished them all.

An Interests and Activities questionnaire is provided on page 2. This may be given immediately following completion of the test or at a later time, if desired. The instructions are: The examiner is to read the directions aloud and explain that pupils are to draw a circle around "L" for things they like or would like to do. They are to draw a circle around "D" for the things they really do.

For use of the Interests and Activities questionnaire, see Part XI of this Manual.

*Note for Machine Scoring Answer Sheet.* When the special machine scoring answer sheet is to be used read the instructions given on this answer Sheet. Do not read the instructions on page 2 of the test booklet.

### Part VII. Directions for Scoring

Use the answer key which is furnished with the test to determine desirable responses in each section of the test. There are twelve items in each sub-section and *the score for each column is the number of pupil responses which conform with the answer key.* Indicate desirable responses with a C.

If erasures or changes are made, consider the intent of the pupil.

If both YES and NO are marked, or if the answer is omitted, no credit is given.

Needless to say, care must be taken to apply the correct column of the answer key to the proper test column.

Count the desirable pupil responses (number of C's) and record the number on the dotted line at the bottom of each column.

### Part VIII. Directions for Recording and Charting Scores and Percentiles

The steps in recording and summarizing data on the front page of the booklet are as follows:

1. Transfer the section scores of each of the twelve sections to the right of the 12's in the column headed "Pupil's Score."



2. Add the scores of Sections I, A-F, to obtain the Self-Adjustment Score.

3. Add the scores of Sections II, A-F, to obtain the Self Adjustment Score.

4. Add the self Adjustment and the Social Adjustment scores to obtain the Total Adjustment Score.

5. To determine percentile ranks for each section and for total adjustment refer to the table of percentile norms on the last page of this Manual. (See illustration on page 7).

6. To prepare the chart on the right half of the page, mark with an x the percentile rank for each section and connect these x's with lines in Sec. 1 and in Sec. 2. Also indicate with an x the percentile rank for Total Adjustment.

Directions for interpretation of these data and for pupil guidance are given in Part IX. Briefly, it may be stated that maladjustment in the various components is indicated when the pupil's score is among the lower percentiles, or when the chart of percentile graph tends to the left.

In the event that the examiner believes there are serious divergencies in the profile from observed behavior, read the comments in Part X.

## **Part IX. Directions for Interpreting Profiles and Guiding Adjustment Activities**

### **A. Pupil Adjustment a Problem for All Teachers**

Examination of the completed profiles for the pupils of a class will usually reveal the fact that the need for assistance in improving personality and social adjustment is not restricted to a limited number of "problem" children; instead, the *impact and interaction of environmental factors with individual needs and desires creates some adjustment problems for all.*

These adjustment problems vary in complexity. The great majority of them are probably unfortunate habit patterns of feeling and action which must be changed. Others have their origin in physical difficulties which must be relieved or corrected before re-education is possible. Actual or virtual mental deficiency may account for others. An appreciable number of problems undoubtedly arise from deep seated conflicts which must be detected and brought to light. These conflicts may result from such factors as feelings of insecurity, real or fancied, injury to the individual or to others, and to lack of successful achievement either in or out of school. In some instances lack of adjustment may be evidence of actual or incipient mental disorders which teachers may learn to recognize even though they are not qualified to attempt to treat them.

In the past we have emphasized the achievement of such more or less academic outcomes as knowledge, appreciations, attitudes, and skills for all pupils in proportion to their capacities and needs. A better understanding of the nature of the child

and his problems now leads us in a similar manner to recognize and to meet the needs of pupils for assistance in personality development and social adjustment. Just as the teacher periodically combines the results of informal observation and tests to evaluate academic achievement, she may now combine informal observation, the testimony of the profile, and other types of evidence to determine individual success or need for assistance in personality problems and social adjustment difficulties.

### **B. Studying the Profile**

The profile (personality picture) has been divided into twelve aspects or components because these seem to represent the most important identifiable personality and social adjustment areas. An attempt has been made to give these components names which correspond in a general way to child behavior concepts with which teachers are already familiar. Please note that components 1E, 1F, and 2C represent undesirable tendencies. The test is so devised, however, that a *high* score means a *favorable* score, and is to be interpreted as *freedom from* withdrawing tendencies, nervous symptoms, and anti-social tendencies.

Each component (self-reliance, for instance) is composed of twelve personal questions yielding definite evidences of the presence or absence of an adjustment problem of its kind. From the profile the teacher first discovers the components, if any, in which a given pupil deviates seriously from children in general. Such components may next be examined to discover specific answers which reveal lack of adjustment.

In general, a study of the test results may consist of the following steps:

1. Determining the number of pupils who deviate seriously in each component. This information will reveal what component areas constitute adjustment problems for the group as a whole.

2. Determining the specific items of each of the above components which are giving difficulty. These specific difficulties may then be treated as specific class adjustment problems.

3. Studying the individual profiles which deviate markedly from the general class problems and determining the specific difficulties of each such pupil.

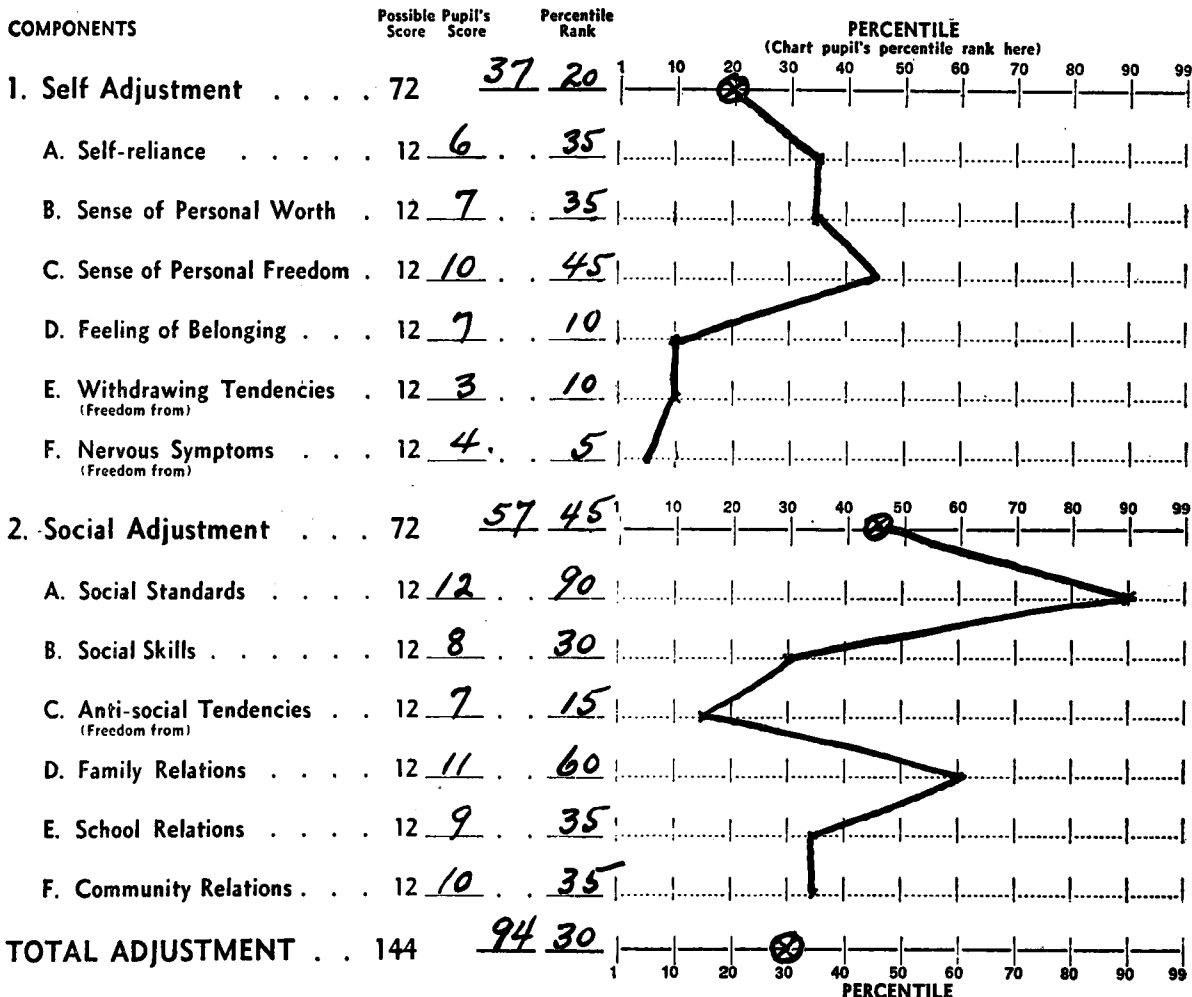
4. Studying the pupils' records of interests and activities, both for possible causes of difficulty and for clues to appropriate remedial treatment.

### **C. General Principles of Method**

In the past it has been a too common practice, in giving various personality inventories and interest blanks, to note total or partial scores and then to file these results for future action, which rarely materialized. It has been the purpose of the authors of the California Test of Personality to create an instrument which will implement the desire of

*(Continued on page eight)*

Name Mary Brown Grade H6  
 School Fourth St Age 12 Last Birthday Sept 6  
 Teacher Miss Jones Date Nov. 10, 1938 Sex: Boy-Girl



It can be seen that Mary Brown, whose profile is presented, is located at the 20 percentile in self adjustment. This means that this girl surpasses about one-fifth and is surpassed by four-fifths of the pupils on whom the percentile norms of this test are based. Her social adjustment is about average (45 percentile) but not necessarily at a desirable standard.

Although Mary does not believe that her freedom is unduly limited, she is experiencing definite difficulties in other ways. She apparently feels reasonably secure and happy in her home, but does not have an adequate feeling of belonging or of being accepted in other situations. This condition is reflected by her tendency to withdraw and to report anti-social behavior, in her nervous symptoms, and in her less successful school and community relations. Mary, since she ranks high in her knowledge of social standards, apparently does not lack ability

to comprehend the nature of social obligations. This assumption should, however, be checked against her mental maturity or intelligence test scores and her academic success. It is obvious that despite her knowledge of social standards, she is considerably below average in social behavior and skills.

The profile as a whole suggests decided feelings of insecurity and self-concern which are not being adequately met and which might easily lead to more serious difficulties unless help is given this pupil. An examination of the specific item answers, particularly in those areas in which the percentile rank is low, will reveal the responses which resulted in the unsatisfactory ratings secured. These responses should then be analyzed and interpreted in relation to the recommended plan of treatment given in Part IX of this Manual.

teachers to direct learning and adjustment in harmony with the major objectives of modern conceptions of education. In other words, the test represents a means by which teachers can more easily and effectively translate their desires to aid children into actual accomplishments.

The modern curriculum emphasizes the democratic ideal of learning and adjustment through freedom and direction. Since it is so often the only part of the child's environment which may be specifically planned to meet his interests and needs in the light of his capacities, the curriculum may well be regarded as a crucial factor in the development of symmetrical, effective, and well-balanced personalities.

In general, the improvement of personality and social adjustment consists of learning to substitute better responses for unsatisfactory or inadequate reactions in the concrete types of situations in which the pupil experiences adjustment difficulties. This means that the point of departure in aiding pupils to make better adjustments should be by way of an attack on the particular difficulties revealed by the test profile.

There are two major approaches, with their many variations, in the matter of pupil adjustment methodology. These contrasting approaches may, as a matter of convenience, be called the *direct* and the *indirect*. In the former the pupil is informed and *understands the purposes of the activities* in which he engages and may thus be led to cooperate voluntarily. By the latter method, the pupil is led to engage in or refrain from activities and to clarify errors of feeling or thinking which will improve his outlook *without being made conscious of the process* itself. This technique is somewhat analogous to that of obtaining correct expression in beginning reading by asking appropriate questions. Where the cause or contributing factor in maladjustment has been the teacher or a parent, care must be exercised in the use of the direct method. In such an instance, both the teacher and the parent should take a less evident part in remedial activity.

Teachers should exercise the greatest care in distinguishing between *symptoms* and *causes* of personality difficulty. In identifying types of maladjustment and planning remedial activity, the teacher must not lose sight of the danger of regarding symptoms as basic causes of personality disturbance and of attempting to remedy these difficulties by the mere elimination of symptoms. Causes of maladjustment frequently lie deeply imbedded in the emotional life of the child and can be identified only by careful and painstaking diagnostic study.

Remedial activity or treatment may for convenience be classified into six types, as follows:

1. *Personality exercises and practice.* This type of treatment is particularly useful for changing undesirable habit patterns. Examples of such patterns abound in the *self-reliance* and *social skills* components of the test.

2. *Correcting erroneous beliefs and attitudes.* Such attitudes occur in components dealing with knowledge of social standards, sense of worth, feeling of belonging, sense of freedom, and in many family, school, and community relationships.

3. *Dealing with unfavorable environmental conditions.* Frequently the child could adjust satisfactorily except for certain factors in his home, school, or community environment. A change in attitude or activity on the part of teachers, parents, or neighbors frequently aids in the solution of a difficult problem.

4. *Modifying undesirable forms of attempted adjustment.* The treatment in this form of disturbance constitutes a different type of procedure. The maladjustments in question are illustrated in the *anti-social* and *withdrawing* tendency components.

5. *Elimination of physical and nervous difficulties.* These difficulties are fairly objective and easily recognized. They are sampled in the *nervous tendency component*. They may require medical attention and treatment. Their elimination may, however, involve considerable mental hygiene work with the children afflicted.

6. *The recognition and recording of apparent mental disorders.* Many children, at one time or another, appear to be egoistic and conceited; often they give evidence of being unduly suspicious. But when these and other more or less common, yet undesirable, adjustment tendencies become habitual or extreme, they may lead to serious mental disorders.

It is apparent that *no one component of the test should be treated as a completely independent unit in personality*. Neither should re-education activities be planned without reference to all other components. In addition, such sources of information as school records of ability, interests, and achievement, as well as other facts regarding home, out-of-school activities, and the like, should be investigated in difficult cases.

There are two basic principles which must be observed regardless of what method of treatment is indicated:

1. *The maladjusted child must often have something definite done for him before he can help himself.* Often positive social adjustments cannot be made until self-confidence and feelings of personal security are restored. Thus it is important that teachers attempt to determine the underlying *causes* of observed difficulties.

2. Adjustment problems should be broken into their simpler elements in order that improvement activities may be chosen with due regard to the needs and progress of the pupil. When the pupil does not seem sufficiently challenged by the methods utilized, the teacher may safely suggest more stimulating activities; but if the child fails in his efforts it may be necessary for the teacher to retrace her steps and break down the problem into its simpler phases.

The teacher should show the child that learning to deal with one's self and with others in an intelligent, sympathetic, and many-sided manner is one of the most important ways to attain happiness and success in life.

Space will not permit a separate illustration for each component of the profile; instead, six illustrations of these *six approaches to improvement* will be given.<sup>1</sup>

#### D. Illustrative Examples and Suggestions for Treatment

##### 1. SITUATIONS REQUIRING PRACTICE

###### Component 1A: Developing Self-reliance.

Form A, Item 5: Is it easy for you to recite or talk in class?

A pupil is self-reliant if he performs many acts in a way that indicates an inner feeling of assurance and security. If he is unable to perform these acts in this manner he is said to lack self-reliance. The basic principle of improvement, therefore, consists of creating such confidence through sympathetic and intelligent planning of definite situations for practice purposes.

If the pupil deviates sufficiently in this component (as revealed by the profile) to warrant special attention, each evidence of difficulty should be noted.

Inability to recite in class is one of a number of definite acts which reveals a lack of self-reliance. The teacher should study related evidence (including other components of the profile) pertaining to the child and evaluate the seriousness of his difficulty, in order to determine to what extent the improvement exercises in this field should be simplified. In the most serious cases the simplification might be carried to the point indicated in the following example. For less involved cases, several of the first steps might be omitted. It is assumed, of course, that *the child in question has been relieved to as great an extent as possible of feelings of insecurity and of destructive emotional conflicts.*

a. Tell the pupil before class time that he will be called upon in class to answer a question, the correct response to which is "Yes," or the answer to which he knows. (This step may be utilized for as many days as seems necessary.)

b. Repeat the above step, utilizing a more complete statement. (This and all succeeding steps should also be repeated as many times as seems appropriate under the circumstances.)

c. Without previous warning, ask a simple question which the teacher is sure the pupil can answer.

d. Ask the pupil to make a brief report (from where he is sitting), reading from his notes if necessary.

e. Ask the pupil to make a brief report without notes.

f. Ask the pupil to prepare to express his opinion or give his reaction tomorrow to some discussion that took place in class today.

g. Continue to increase the complexity of the tasks until the pupil's confidence is as near normal as possible for his grade level.

If the difficulty arose as more or less simple unfortunate habit patterns, continued attention should result in the formation of the desirable response. If success does not follow practice, re-examine the evidence with the possibility of other types of treatment in mind.

The above illustration has made use of the *direct method*. The direct method of personality improvement involves a *unique form of cooperation between the pupil and his teacher*. In general, it consists of five steps:

1. The pupil must be sure of the teacher's sympathy and respect.

2. The pupil must feel sure that the teacher understands his difficulty.

3. Consideration of the problem must develop a *feeling of security* and a *desire to improve* on the part of the pupil. The seriousness of difficulties should not be overemphasized.

4. In the light of available knowledge about the pupil and of the seriousness of his adjustment difficulties, the teacher must break down his problems into their appropriate elements.

5. The teacher should guide the pupil in a graduated series (from easy to more difficult) of adjustment activities which challenge but do not defeat him.

Where pupils are very young, unduly sensitive, or for other reasons it appears unwise to use the direct method, the teacher may omit the first three steps of the direct method, reduce the problem to simpler elements, and lead the maladjusted pupil, by various devices, to a series of successful reactions to situations which previously caused difficulty.

In order to make it more definite and meaningful, the foregoing illustration has been related to a specific difficulty. However, virtually the same approach may be used in most situations where practice will aid in solving the difficulty.

##### 2. ERRONEOUS BELIEFS AND ATTITUDES

###### Component 1D: Feeling of Belonging

Form A, Item 40: Are you as well and strong as most boys and girls?

Assume that a pupil answered "No" to this question. The fact that he may be wrong as shown by later investigation *does not change the unfavorable influence of his belief or attitude*. It is necessary in some way, through explanation or evidence, actually

<sup>1</sup> Teachers who desire to make a more comprehensive study of adjustment problems are referred to the following works: Thorpe, L. P. *Psychological Foundations of Personality*. New York: McGraw-Hill Book Company, 1938; Tiegs, E. W. and Katz, B. *Mental Hygiene in Education*. New York: Ronald Press Company, 1941; Witty, P. A., Skinner, C. E. and Others. *Mental Hygiene in Modern Education*. New York: Farrar and Rinehart, 1939; Shaffer, L. F. *The Psychology of Adjustment*. Boston: Houghton, Mifflin Company, 1936; and Rivlin, H. N. *Educating for Adjustment*. New York: D. Appleton-Century Company, 1936.

to change the attitude of this pupil before the influence of the erroneous belief can be eliminated.

*An approach characterized by sympathetic interest and understanding on the part of the teacher, and a knowledge on the part of the pupil that the teacher is not judging or accusing, but simply explaining, will often eliminate the problem.*

The general method of approach in handling these erroneous beliefs and attitudes which are responsible for another large proportion of adjustment difficulties may be stated as follows:

1. Determine whether or not the pupil is right in his beliefs or attitudes.

2. If it is found that he is mistaken, explain his difficulties and show him his errors.

3. If the pupil is not convinced ask him to keep a record of his specific "weaknesses and illnesses" (or other erroneous beliefs). The mere keeping of a record will often convince him of his error.

4. If he keeps a record of actual instances of weaknesses and illnesses and they appear to uphold his belief, the teacher must often readjust her first judgment. If, however, she is still convinced that the pupil is wrong, it is advisable to gather similar evidence regarding the extent to which other children face and meet the same problems. In the present instance it would be a record of the extent to which other pupils exhibited the same weaknesses and illnesses. If this evidence shows that the status of the pupil in question is typical of children, he no longer has any justification for his attitude.

5. If the pupil still persists in his belief, it may be based on other factors. Search should be made for evidence of conflicts in other components, for excessive feelings of inferiority, or for difficulties in his record of ability and achievement.

6. If investigation proves that the pupil was right to begin with and that the evidence he gathered seems to uphold his point of view, the handling of his problem requires the modification of his activities to suit his physical condition and may be carried on in accordance with the procedures outlined in our next remedial section (No. 3), dealing with unfavorable environmental conditions.

It is rarely necessary to go into such detail with single evidences of difficulty, and then usually only when the pupil deviates markedly in the component in question from the general pattern of most children as revealed by the profile. But if children are more important than subjects, equipment, and time schedules, the wise teacher will be willing to go into this detail in order that they may be properly oriented and assisted in their efforts to make successful adjustments.

The same approach with appropriate modifications may be used in other similar types of difficulty.

### 3. DEALING WITH UNFAVORABLE ENVIRONMENTAL CONDITIONS

#### Component 2E: School Relations

Form A, Item 124: Is your school work so hard that you are afraid you will fail?

#### Component 2D: Family Relations

Form A, Item 120: Have you often felt that your folks thought you would not amount to much?

Assume that the pupil answers "Yes" to both of these and similar questions and that he is right in his beliefs. In both these instances something should be done. In the first case, the school has the major responsibility, and in the second, the problem is one for the home.

The school has long been aware of the first problem but only recently has it been possible to approach the solution for it with a rational and defensible plan. The mental age or intelligence quotient of a pupil reveals neither the cause nor the method of prevention of failure; neither does it reveal the worry and stress to which the personality of a child is being subjected. The child should be shown an analysis of his learning difficulties, given some reduction in amount of work, and any other kind of treatment necessary to the development of a feeling of security. He should be put on a basis of equality with those who happen to be so constituted that they fit well into the program as it exists. In short, the school program should fit the maturity level of each child. Sometimes this ideal requires a distinct change in teacher attitudes and procedures.

The second problem is more time consuming but just as important. It usually involves contact with individual parents and great tact is sometimes necessary to make them understand how they are defeating their own purposes and failing as parents when they destroy the feeling of security and of achievement necessary for personal growth and adjustment on the part of their children.

After the problem of a schoolroom or of a whole school have been tabulated from the profile answers, the most general difficulties can be handled by the principal and teachers in informal talks to their pupils. These problems may also be made the subject of parent-teachers' and mothers' club meetings. Frequently outside speakers can be used to advantage after they have been informed of the major adjustment problems which exist in a particular group.

In addition to this general approach, the following technique will be found useful in handling individual parents:

1. Meet parents casually and "size them up." Try to determine what personality characteristics they exhibit.

2. If they appear to be intelligent, understanding, and cooperative, begin at once explaining the pupil's

difficulties and asking for their cooperation. Suggest definite things for them to do in changing the pupil's attitude.

3. If the parents are unfriendly, indifferent, or conditions are otherwise unfavorable, they must be influenced through P. T. A. or other meetings and through personal contacts before the erroneous attitude is mentioned.

4. If the family is cooperative but unconvinced, attempt to have them keep a record for a short time of actual instances in which they exhibit the attitude which is so discouraging to the child.

5. It is not necessary that the parent admit his error, if he is in error, or that the child be made to admit his error in case the parent is right. Merely raising the question, dealing with it objectively so far as the facts of the case will permit, and discussing the difficulties and their implications is as far as the teacher can usually go. This procedure will, however, often improve the situation considerably, if not entirely eliminate the difficulty. Furthermore, the teacher frequently can compensate for the ill effects of the parents' treatment by giving the child the feeling of self-respect and security which he so much needs.

The specific difficulties mentioned above are representative of a large class for which the same general type of remedial procedures may be used.

#### 4. DEALING WITH ANTI-SOCIAL AND WITHDRAWING TENDENCIES

##### Component 2C: Anti-social Tendencies.

Form A, Item 108: Do you like to scare or push smaller boys and girls?

##### Component 1E: Withdrawing Tendencies

Form A, Item 55: Are people often so unkind or unfair that it makes you feel bad?

For the most part, children tend to scare, push, bully, dominate, and otherwise mistreat younger or smaller boys and girls because of inner feelings of inferiority or lack of ego recognition. The sufferer tries to *convince himself* that he is *not* inferior to others. His bullying is an anti-social way of attempting to compensate for his feeling of weakness.

Children withdraw from their problems and are characteristically shy, timid, sensitive, suspicious, and given to daydreaming about their troubles for much the same reasons. Such children tend to give up the battle of life; their daydreams are but substitute avenues to the goal of all children—that of being considered successful and worthy. The withdrawing tendency is considered serious because it leads to a disinclination to adjust to real people and to society in general.

Some pupils will give a large number of "yes" answers to questions such as "Do you like to scare

or push smaller boys and girls?" and "Are people often so unkind or unfair that it makes you feel bad?" Such responses are indicative of the need for a deeper feeling of security.

In general, the following treatment is recommended:

1. Develop the best teacher-pupil relationship possible. Let the teacher lose no opportunity to convince the pupil of her sympathetic understanding.

2. Whenever possible, give the pupil ego-satisfying responsibilities such as policing street crossings, acting as club or group leader, or assisting in other school responsibilities. Care must be observed to assign responsibilities which the maladjusted pupil can and will carry successfully and which will not be resented by other pupils.

3. Adjust regular school tasks and activities to the needs and capacities of the pupil. Make a complete and detailed analysis of his difficulties and work with him until he wins success, with its attendant satisfaction, within the limits of his possibilities.

4. The major objective in this instance is adjustment and success within the pupil's own limitations, and not conformity to standards, some of which his limitations will prevent him from attaining. The teacher must find a sufficient number of activities in which the pupil can thus be successful if she is to provide the necessary feelings of security and relieve him of the necessity of maintaining his ego by anti-social or withdrawing behavior.

#### 5. DEALING WITH NERVOUS SYMPTOMS

##### Component 1F: Nervous Symptoms

Form A, Item 63: Do you bite your fingernails often?

Form A, Item 66: Do you often find you are not hungry at meal time?

Form A, Item 72: Do your eyes hurt you often?

Some of these symptoms, such as lack of appetite, eye strain, dizzy spells, headaches, and chronic fatigue may be due to physical disorders of the body, and should thus be diagnosed and treated by an authorized physician. Many physical symptoms of this kind, however, are caused by feelings of insecurity and by emotional conflicts.

Children suffering from these nervous difficulties are usually unhappy in their homes, have few good friends, lacking in social skills, and very much inclined to utilize their energy in self-concern and self-pity. Psychologically, the chief difficulty with such unfortunate boys and girls is that their attention is centered upon their own troubles rather than upon the interesting things that are going on around them. This is usually caused by the fact that these children have for years been frustrated in their efforts to

secure the response and recognition from parents and others that provides the much coveted feeling of being wanted, of being considered worthy and successful. Thus, these neurotic children are maladjusted in both the self and the social phases of life.

The following methods of handling difficulties of this kind are recommended:

1. Examine the pupil's health record in the nurse's or physician's file. If the record is old or otherwise unsatisfactory, or no record of a physical examination is available, such an examination should be requested.

2. If the examination record appears to reveal any evidence of a physical basis for nervous tendencies, the pupil should be referred to a physician for treatment.

3. If the physician reports no physical basis for adjustment difficulties the most probable cause of these nervous symptoms is similar to the major cause of anti-social behavior and withdrawing tendencies; namely, the lack and need of a feeling of greater personal security.

4. Provide the appreciation, approval, and ego satisfactions that the child's nature craves as recommended for anti-social behavior and withdrawing tendencies, but with the following modification: endeavor to restore hope and confidence before attempting to delegate responsibilities. This may be done by setting up conditions which tend to guarantee recognized success in school and elsewhere.

5. Pupils suffering from nervous symptoms are aided by physiological as well as psychological relaxation. Teachers should avoid putting them in tension-producing situations. Excessive self concern must gradually be replaced by satisfying experiences with others if nervous tensions are to be relieved.

6. The Beta hypothesis (negative practice) technique, as developed by Dunlap, is good for nervous tics. In other words, actually practicing a periodic closing of the eyes, muscle tremor, or other nervous tic aids in gaining conscious control over it and thus assist in its elimination. Such practice should, however, be directed by a psychologist, or a teacher who has been specially trained.

## 6. DEALING WITH MENTAL DISORDERS

In general, mental disorders may be considered extreme and persistent deviations from normal adjustment. From the standpoint of the teacher there would be reason to suspect such a case when long and persistent treatment with one or more of the first five treatment types was unsuccessful. However, the lack of teacher success is not proof of mental disorder. Under no circumstances should untrained teachers suggest the existence of such a disorder. They should first of all seek the cooperation

of the parents. If the child is referred to a psychiatrist or a clinic the teacher should give as objectively as possible the data which she has gathered and the treatment which she has attempted, and then cooperate with the psychiatrist or agency which is taking over the treatment of the case.

It should be recognized, however, that some children display the early symptoms of what is in legal terms called "insanity" under the very eyes of the teacher. Many of those unhappy pupils are no doubt disintegrating in their emotional life due to excessive frustration and the constant presence of hostility. Certainly an appreciable fraction of this group could be assisted to better adjustment if they were detected and treated in time.

At any rate, there is danger that teachers untrained in mental hygiene matters will overlook symptoms of grave significance in the behavior of their charges. As a prominent psychologist recently commented, it is a matter of no small import that some teachers, as well as parents, permit small children to manifest symptoms of psychosis (insanity) that may later become decidedly serious, without doing anything about them until it is too late. As an example, the child who is conceited and egoistic, who displays a superficial attitude in his relations to other people, and who is markedly suspicious may be developing the form of insanity called paranoia (a psychosis characterized by attitudes of conceit and grandeur and by systematic delusions of persecution).

## E. Conclusions on Pupil Adjustment

Finally, the teacher should realize that children do not group themselves into personality types and that patterns of maladjustment often include disturbances in several of the components that have been included in the test. A child may, and ordinarily will, need assistance in several of the areas of possible disturbance. A pupil who lacks self-reliance may have erroneous attitudes, may be out of harmony with school and home regulations, and may be decidedly inclined to be anti-social in his relations to others. Maladjustments are not confined to types; they present a variety of symptoms that may pervade many areas of both self adjustment and social adjustment.

Because all aspects of personality are closely interlocked or integrated, remedial treatment that develops self-reliance may also eliminate anti-social behavior. And a change in environment that stimulates the withdrawing child to attack his problems may bring about a reduction in nervous symptoms as well. In short, sympathetic help that enables an unhappy child to find self-realization and to develop generous social attitudes will tend to help him achieve that balance of personality that makes for good life adjustment.

## **Part X. Directions for Checking Profiles Which Appear to Diverge from Observed Pupil Adjustment**

If a pupil appeared ill or disturbed when responding to the questions of the test he should be given an opportunity to repeat the exercises at a more favorable time.

If lack of reading ability was a disturbing factor the teacher may give and interpret orally such parts of the test as appear to be in conflict with her observations.

If it appears that the pupil has consciously misrepresented himself, a number of checks are possible with most of the items:

1. Other teachers familiar with the pupil may be asked to respond to the items in question.
2. A few pupils may be asked to complete profiles for each other, including the pupil under examination.
3. After the parents have been appraised of the nature and objectives of the test they may be asked to complete the items in question.
4. The pupil may be requested to repeat his performance at another time.
5. The teacher may keep a record of careful, systematic observation over a sufficiently extended period of time to obtain an adequate sampling of the pupil's characteristic behavior.

It should be remembered that not many such problem cases arise. The major purpose of the test is to detect the actual or incipient difficulties of normal children in order to aid them in making better adjustments. But when apparent discrepancies arise between pupil responses and teacher observations it is important to determine the facts in order that remedial activities may be intelligently directed. The teacher should not trust her informal opinions too far; evidence from the test will usually be much more valid. Furthermore, it must be remembered that teachers sometimes stimulate unnecessary pupil maladjustment by their unjustified unfavorable attitudes toward both individual pupils and whole classes.

## **Part XI. Interests and Activities**

The Interests and Activities questionnaire (page 2 of test booklet) is not a part of the test proper and is not scored or charted on the first page profile as are the twelve adjustment components. The teacher will find it profitable to study the responses in this Interests and Activities questionnaire for pupils whose percentile profiles are low or to the left in any of the twelve components, and for others about whom additional information is desired.

The questionnaire yields four types of information about seventy-four different interests and activities: (1) The things the pupil likes, or would like very

much to do, but does not do; (2) The things the pupil likes, or would like to do, and actually does; (3) The things which the pupil does not like, or does not wish to do, but actually does; (4) The things the pupil neither likes nor does.

The interest and activity items are divided into (a) those of a primarily individual nature (Items 1-46) and (b) those that are predominantly social (Items 47-74). Within each of these two groups the items are arranged in the general order of the amount of activity involved, beginning with the more passive or sedentary types and advancing to those involving more activity or social participation.

After the teacher has identified the component or components in which a pupil appears to be experiencing difficulties, and has reviewed such other data as she can obtain regarding such factors as health, attendance, ability, and achievement, she should examine the pupil's responses to the Interests and Activities questionnaire.

A study of the questionnaire will still further enlarge the teacher's understanding of a pupil's personality, lend additional assistance in determining the cause or causes of his difficulty, and provide clues for planning remedial work. Among other facts, the teacher should endeavor to determine why the pupil fails to do things that he would enjoy doing but does not do, why he does not like some of the things he does do, and whether or not anything can be done to bring about a better adjustment in the interests and activities field.

In general, a wide range of interests and activities is evidence of good adjustment; a narrow range in this respect may be indicative of actual or potential maladjustment. Therefore, a basic principle in dealing with most adjustment difficulties of this type is that of stimulating individual and social interests, and encouraging the pupil to become more active in such interests and activities as may be suited to his degree of physical, social, and mental maturity.

## **Part XII. Administrative Uses**

Although this test has been designed primarily to aid teachers in detecting and dealing with adjustment problems, its usefulness is not confined to the individual classroom.

The normative data, or scores on the various sections of the test should be summarized on the blanks provided in order that they may supply administrative officers with information regarding the adequacy of personal and social adjustment in:

1. Single classes in a given school
2. Individual schools
3. The whole school system.

If the majority of self adjustment scores for a school or school system are low, it may indicate that the educational procedures in vogue are too formal or traditional and that more informal activities should be undertaken. If scores on freedom from withdrawing tendencies, freedom from nervous



symptoms, and freedom from anti-social tendencies are low, it may indicate that the course of study materials are too difficult for pupil capacities. Such a situation might well be investigated. Low scores on social standards or social skills suggest the desirability of more emphasis on aspects of social training, etiquette, and attitude building which, in some school systems, are not regarded as being a part of the regular curriculum. Low scores on the community relations section of the test may indicate too little stress on school-community relations and suggest more emphasis on interpreting the activities and needs of the community in terms that children can comprehend.

Unsatisfactory school and school district trends revealed by percentile summaries are to be regarded as the point of departure for investigating the need or desirability of modifications in the objectives, materials, and procedures of the curriculum.

Teachers, supervisors, and administrators should be alert to the opportunities which are provided in the school environment for setting up stimulating situations that may act as important factors in the processes of pupil adjustment. The school provides many normal situations in which there are opportunities for social interaction, wholesome conflicts and accommodations, applications of social controls, exercise of leadership, and acceptance of responsibilities. These facilities should be inventoried, utilized, and when necessary, modified to harmonize with such objectives and procedures as a requisite to the development of well-adjusted and effective personalities.

A careful analysis of the available opportunities for personality development and their constructive utilization in the problem of pupil adjustment is the privilege and opportunity of all who are engaged in conducting the Nation's educational program.

### Part XIII. Percentile Norms

The percentile norms provided on the last page of this Manual were derived from test data for over 1000 pupils in grades four to eight inclusive in twelve different schools in and near Los Angeles, California. A percentile may be described as a point on a 100 point scale which gives the per cent of scores which fall below that particular percentile. For example, a pupil whose score falls at the 35 percentile point exceeds 35 per cent of the pupils on whom the test was standardized; such a score may also be interpreted to mean that this pupil is lower than 65 per cent of the pupils in the standardized group.

The statistical treatment of experimental data revealed no significant differences between median scores of successive grade levels. There was, however, a slight tendency, possibly significant in two or three of the components, for the girls' responses to average slightly higher than those of the boys. Whether such differences will prove to be fundamental and socially desirable or whether they are more or less accidental, unnecessary, and undesirable, is not yet known. Sex differences may be due to several factors, including the possibly greater docility and willingness of girls to adjust to certain types of situations. Such differences may, on the other hand, be accounted for by the fact that the school environment and other factors have combined to provide conditions which lead to better adjustment patterns in certain areas in the case of girls.

The authors believe that in the light of present knowledge the same standards of adjustment for boys and girls is a defensible ideal and that teachers and parents alike would be opposed to separate standards for the sexes. For this reason they have combined the data for boys and girls in deriving standards

**Examiner's Memoranda:**

## PERCENTILE NORMS

	Percentile:	1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	99
Sec. 1. Self Adjustment.....Score:	16	25	30	34	37	40	43	45	48	50	52	54	56	58	60	62		65	67	70	72	
Sec. 2. Social Adjustment..Score:	27	34	39	44	47	50	52	54	56	58			62		65		68		69	70	71	72
Total Adjustment .....Score:	43	59	69	78	84	90	95	99	104	108	111	114	118	121	125	128	131	134	137	141	144	
	Percentile:	1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	99

## SUB-SECTION SCORES AND PERCENTILES

Self Adjustment		Score:	1	2	3	4	5	6	7	8	9	10	11	12
1-A	Self-reliance .....	Percentile	1	1	5	10	20	35	55	70	80	90	95	99
1-B	Sense of Personal Worth.....		1	1	5	10	15	25	35	50	65	80	90	99
1-C	Sense of Personal Freedom.....		1	1	1	1	5	5	10	20	30	45	65	90
1-D	Feeling of Belonging.....		1	1	1	1	1	5	10	15	25	40	65	90
1-E	Withdrawing Tendencies .....		1	5	10	15	20	30	40	50	60	70	80	95
1-F	Nervous Symptoms .....		1	1	5	5	10	15	20	30	40	55	75	95
Social Adjustment														
2-A	Social Standards .....	Percentile	1	1	1	1	1	1	5	10	20	35	60	90
2-B	Social Skills .....		1	1	1	5	10	15	20	30	45	65	80	95
2-C	Anti-social Tendencies .....		1	1	1	1	5	10	15	20	30	45	65	90
2-D	Family Relations .....		1	1	1	1	5	10	15	20	25	40	60	90
2-E	School Relations .....		1	1	1	1	5	10	15	20	35	50	65	90
2-F	Community Relations .....		1	1	1	1	1	1	5	10	20	35	55	85
		Score:	1	2	3	4	5	6	7	8	9	10	11	12

**DIRECTIONS:** To find the percentile value of self, social, or total adjustment score—use the upper table, locate the score, and read the percentile above or below the heavy black lines. Thus a score of 96 in total adjustment has a percentile value of 35. To find the percentile value of a component or sub-section score—use the lower table, locate the score above or below the black lines, and read the percentile opposite the appropriate component. Thus a score of 8 in the self-reliance component has a percentile value of 70. See also description of the profile on page 7.

# PROGRESSIVE ACHIEVEMENT TESTS—INTERMEDIATE BATTERY Form A

(Diagnostic Tests Keyed to the Curriculum)  
Devised by Ernest W. Tiegs and Willis W. Clark.

Name \_\_\_\_\_ Grade \_\_\_\_\_ Sex **B-G**  
School \_\_\_\_\_ Age \_\_\_\_\_ Birthday \_\_\_\_\_  
Teacher \_\_\_\_\_ Date \_\_\_\_\_

TEST	SUBJECT	Possible Score	Pupil's Score	Grade Placement	DIAGNOSTIC PROFILE (Chart pupil's scores here)											Percentile Rank									
					4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0													
1. Reading Vocabulary		90	_____	_____	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	_____				
A. Mathematics		22	_____	_____	4	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	_____				
B. Science		23	_____	_____	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	_____	
C. Social Science		23	_____	_____	2	3	4	5	6	7	10	11	12	13	14	15	16	17	18	19	20	21	22	_____	
D. General		22	_____	_____	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	_____
2. Reading Comprehension		55	_____	_____	9	12	15	18	20	22	25	27	30	33	35	37	40	42	44	46	50	_____			
E. Following Directions		10	_____	_____	2	3	4	5	6	7	8	9	10	_____											
F. Reference Skills		15	_____	_____	4	5	6	7	8	9	10	11	12	13	_____										
G. Interpretations		30	_____	_____	5	7	9	10	11	12	14	16	19	22	24	25	26	27	_____						
TOTAL READING		145	_____	_____	20	30	40	50	60	70	80	90	100	110	120	135	_____								
3. Arithmetic Reasoning		55	_____	_____	2	3	4	6	8	10	12	14	18	20	22	26	30	32	36	38	40	44	46	48	_____
A. Number Concepts		15	_____	_____	1	2	3	4	5	6	7	8	9	10	11	12	13	14	_____						
B. Symbols and Rules		15	_____	_____	1	2	3	4	5	6	8	9	10	11	12	13	_____								
C. Numbers and Equations		10	_____	_____	1	2	3	4	5	6	7	8	9	_____											
D. Problems		15	_____	_____	1	2	3	4	5	6	7	8	9	10	11	12	13	_____							
4. Arithmetic Fundamentals		80	_____	_____	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	78	_____				
E. Addition		20	_____	_____	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	_____		
F. Subtraction		20	_____	_____	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	_____
G. Multiplication		20	_____	_____	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	_____	
H. Division		20	_____	_____	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	_____	
TOTAL ARITHMETIC		135	_____	_____	7	10	15	20	30	40	50	60	70	80	90	100	110	120	126	_____					
5. Language		110	_____	_____	24	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	_____				
A. Capitalization		15	_____	_____	4	5	6	7	8	9	10	11	12	13	14	15	_____								
B. Punctuation		10	_____	_____	1	2	3	4	5	6	7	8	9	_____											
C. Words and Sentences		20	_____	_____	10	11	12	13	14	15	16	17	18	19	20	_____									
D. Parts of Speech		20	_____	_____	1	2	3	4	5	6	7	8	10	12	14	16	17	18	_____						
E. Spelling		30	_____	_____	2	3	5	7	9	11	15	20	25	27	29	_____									
F. Handwriting		15	_____	_____	6	7	8	9	10	11	12	14	_____												
TOTAL		390	_____	_____	50	80	105	135	160	185	205	225	250	265	285	300	320	335	350	_____					
					4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0													

# DIAGNOSTIC ANALYSIS OF LEARNING DIFFICULTIES

If the diagnostic profile of a test indicates that a pupil is making normal progress in all fields the teacher will have no use for the following diagnostic analysis. However, where the diagnostic profile shows achievement below a desirable standard in one or more major fields, the following device, which appears somewhere on every copy of these achievement tests, will assist in identifying and analyzing the specific causes of difficulty as a basis for remedial instruction.

The numerals and capital letters in the diagnostic analysis correspond to the sections of the test similarly marked. For example, if the diagnostic profile shows unsatisfactory achievement in Test 4, Sec. E (addition in arithmetic fundamentals), an inspection of the unsatisfactory responses in this section of the test (by number) will reveal whether or not remedial instruction is needed in carrying, use of zeros, reducing to common denominators, and the like. These topics are then checked by the teacher as the basis for remedial work.

Once an adequate diagnosis has been made, remedial instruction is frequently a simple matter. However, teachers have in the past found the clerical work incident to following each individual pupil a heavy burden. Such extra work is almost completely eliminated if this diagnostic analysis is torn from the test booklet and kept on the teacher's desk where the various items may be checked off as the pupil masters them.

## READING

### 1. Reading Vocabulary

#### A. MATHEMATICS:

— Basic vocabulary .....1-22

#### B. SCIENCE:

— Basic vocabulary .....1-23

#### C. SOCIAL SCIENCE:

— Basic vocabulary .....1-23

#### D. GENERAL:

— Basic vocabulary.....1-22

### 2. Reading Comprehension

#### E. FOLLOWING SPECIFIC

##### DIRECTIONS:

— Directions requiring simple choice .....1-2

— Reading definitions and following directions .....3-10

#### F. REFERENCE SKILLS:

— Parts of book .....1-5

— Use of table of contents .....6-7

— Use of index .....8-10

— Selecting references .....11-15

### G. INTERPRETATION OF MEANINGS:

— Selecting topic or central idea .....1, 8, 15

— Understanding directly stated facts .....2, 3, 4, 7, 9, 12, 13, 14, 16, 17, 18, 20

— Making inferences .....5, 6, 10, 11, 19, 21, 22

— Comprehension of author's organization of topics .....23-26

— Sequence of events .....27-30

### 3. Arithmetic Reasoning

#### A. NUMBER CONCEPT:

— Writing numbers .....1-5

— Writing money .....6

— Writing per cent .....7

— Roman numbers .....8-10

— Concept of whole numbers .....11

— Concept of fractions and decimals .....12-14

— Concept of negative numbers .....15

#### B. SYMBOLS AND RULES:

— Symbols .....1, 2, 6-10

— Vocabulary .....3-5

— Rules .....11-15

#### C. NUMBERS AND EQUATIONS:

— Negative numbers.....1, 3-5

— Solving equations .....6-10

#### D. PROBLEMS:

— Two-step problems.....1-3

— Sharing and averaging .....1-3

— Square and cubic measure .....4-7

— Commission and discount .....13-15

— Percentage .....9-12

— Ratio .....8

### 4. Arithmetic Fundamentals

#### E. ADDITION:

— Simple combinations .....1-2

— Carrying .....3-6

— Zeros .....2, 5, 8

— Column addition .....4-6

— Adding money .....6, 8

— Denominate numbers .....6-8

— Adding fractions .....9-15

— Reducing fractions to common denom. ....10, 12-15

— Adding mixed numbers .....11-15

— Adding fractions and decimals .....16-17

— Writing decimals in column .....18-19

— Adding percentages .....20

#### F. SUBTRACTION:

— Simple combinations .....1-2

— Borrowing .....3-7

— Zeros .....2, 4, 5

— Subtracting money .....6-7

— Denominate numbers .....6-8

— Subtracting numerators .....9-10

— Reducing fractions to common denominators ....11-12

— Borrowing with mixed numbers .....14-15

— Subtracting: fractions and decimals .....16-17

— Writing decimals in column .....18-19

— Fractional parts .....20

### G. MULTIPLICATION:

— Tables .....1-7

— Zeros in multiplicand .....3, 6, 7

— Zeros in multiplier .....5, 6, 7

— Two-place multipliers .....4-7

— Denominate numbers .....8

— Cancellation of fractions .....9, 11-15

— Mult. num. and denom. ....10

— Fractions and mixed numbers .....13-16

— Fractions and decimals .....17

— Pointing off decimals .....18, 19

— Per cent of number .....20

### H. DIVISION:

— Tables .....1-7

— Zeros in quotient .....2, 6

— Remainders .....7

— Inverting divisor in fractions .....8-15

— Mixed numbers .....13-15

— Reducing fractions to decimals .....16

— Pointing off decimals .....17-19

— Fractional parts .....20

### 5. Language

#### A. CAPITALIZATION:

— First word of sentence .....1-2

— Names of persons .....4, 8

— Names of places .....4, 7

— Days of week and months .....3, 6, 8

— Abbreviations for months.....3

— Title of book .....5

— First word of quotation .....9

— Over-capitalization.....

#### B. PUNCTUATION:

— Periods .....1-2

— Commas .....3-7

— Question marks .....3-7

— Quotation marks .....3-7

— Quotation within quotation ....3-7

— Over-punctuation.....3-7

#### C. WORDS AND SENTENCES:

— Singulars and plurals .....1-2

— Case .....6-8

— Tense .....3-5

— Good usage .....9-10

— Recognizing sentences ....11-20

#### D. PARTS OF SPEECH:

— Nouns .....Adverbs

— Pronouns .....Conjunctions

— Verbs .....Prepositions

— Adjectives

#### E. SPELLING:

—

—

—

#### F. HANDWRITING:

— Legibility .....

## LANGUAGE

## TEST 1. SEC. A.

Directions: Underline the word which means the opposite or about the opposite of the first word. Write its number on the line to the right.

0. large <sup>1</sup> rich <sup>2</sup> small <sup>3</sup> gone <sup>4</sup> away 2 0

1. add <sup>1</sup> about <sup>2</sup> house  
<sup>3</sup> subtract <sup>4</sup> sometime \_\_\_\_\_ 1
2. whole <sup>1</sup> item <sup>2</sup> sweet  
<sup>3</sup> part <sup>4</sup> lower \_\_\_\_\_ 2
3. even <sup>1</sup> rapid <sup>2</sup> regular  
<sup>3</sup> promise <sup>4</sup> odd \_\_\_\_\_ 3
4. purchase <sup>1</sup> spoke <sup>2</sup> sale  
<sup>3</sup> market <sup>4</sup> cloud \_\_\_\_\_ 4
5. total <sup>1</sup> fraction <sup>2</sup> carriage  
<sup>3</sup> native <sup>4</sup> treasure \_\_\_\_\_ 5
6. advance <sup>1</sup> autumn <sup>2</sup> decrease  
<sup>3</sup> cottage <sup>4</sup> model \_\_\_\_\_ 6
7. addition <sup>1</sup> victory <sup>2</sup> review  
<sup>3</sup> subtraction <sup>4</sup> hammer \_\_\_\_\_ 7
8. unknown <sup>1</sup> neglect <sup>2</sup> property  
<sup>3</sup> drum <sup>4</sup> known \_\_\_\_\_ 8
9. domestic <sup>1</sup> foreign <sup>2</sup> election  
<sup>3</sup> contrary <sup>4</sup> perish \_\_\_\_\_ 9
10. divisor <sup>1</sup> plunge <sup>2</sup> submit  
<sup>3</sup> line <sup>4</sup> multiplier \_\_\_\_\_ 10
11. similar <sup>1</sup> publish <sup>2</sup> unlike  
<sup>3</sup> reveal <sup>4</sup> burden \_\_\_\_\_ 11
12. irregular <sup>1</sup> ashore <sup>2</sup> systematic  
<sup>3</sup> countenance <sup>4</sup> hymn \_\_\_\_\_ 12
13. fraction <sup>1</sup> parrot <sup>2</sup> paddle  
<sup>3</sup> spacious <sup>4</sup> integer \_\_\_\_\_ 13
14. equality <sup>1</sup> inequality <sup>2</sup> scandal  
<sup>3</sup> rely <sup>4</sup> pare \_\_\_\_\_ 14
15. creditor <sup>1</sup> meridian <sup>2</sup> debtor  
<sup>3</sup> expand <sup>4</sup> dough \_\_\_\_\_ 15
16. wholesale <sup>1</sup> coral <sup>2</sup> ascribe  
<sup>3</sup> fleecy <sup>4</sup> retail \_\_\_\_\_ 16
17. concave <sup>1</sup> flaw <sup>2</sup> convex  
<sup>3</sup> discretion <sup>4</sup> caramel \_\_\_\_\_ 17
18. annex <sup>1</sup> casket <sup>2</sup> balloon  
<sup>3</sup> separate <sup>4</sup> adult \_\_\_\_\_ 18
19. assessment <sup>1</sup> reduction <sup>2</sup> efface  
<sup>3</sup> dividend <sup>4</sup> loom \_\_\_\_\_ 19
20. bisect <sup>1</sup> binomial <sup>2</sup> double  
<sup>3</sup> reduce <sup>4</sup> increase \_\_\_\_\_ 20
21. base <sup>1</sup> surface <sup>2</sup> diagonal  
<sup>3</sup> altitude <sup>4</sup> contents \_\_\_\_\_ 21
22. asset <sup>1</sup> expense <sup>2</sup> statement  
<sup>3</sup> gain <sup>4</sup> liability \_\_\_\_\_ 22

Sec. A. Score (number right).....

## TEST 1. SEC. B

Directions: Underline the word which means the opposite or about the opposite of the first word. Write its number on the line to the right.

0. large <sup>1</sup> rich <sup>2</sup> small <sup>3</sup> gone <sup>4</sup> away 2 0

1. spring <sup>1</sup> matter <sup>2</sup> rivulet  
<sup>3</sup> autumn <sup>4</sup> year \_\_\_\_\_ 1
2. natural <sup>1</sup> increase <sup>2</sup> artificial  
<sup>3</sup> spread <sup>4</sup> accidental \_\_\_\_\_ 2
3. melt <sup>1</sup> freeze <sup>2</sup> human  
<sup>3</sup> permit <sup>4</sup> farther \_\_\_\_\_ 3
4. constant <sup>1</sup> attack <sup>2</sup> grade  
<sup>3</sup> variable <sup>4</sup> stuff \_\_\_\_\_ 4
5. decay <sup>1</sup> want <sup>2</sup> optical  
<sup>3</sup> punctual <sup>4</sup> growth \_\_\_\_\_ 5
6. contract <sup>1</sup> package <sup>2</sup> expand  
<sup>3</sup> couch <sup>4</sup> glitter \_\_\_\_\_ 6
7. abundant <sup>1</sup> recent <sup>2</sup> process  
<sup>3</sup> minute <sup>4</sup> summon \_\_\_\_\_ 7
8. consume <sup>1</sup> hillside <sup>2</sup> girdle  
<sup>3</sup> fern <sup>4</sup> develop \_\_\_\_\_ 8
9. invisible <sup>1</sup> monkey <sup>2</sup> reasonable  
<sup>3</sup> visible <sup>4</sup> stupid \_\_\_\_\_ 9
10. compound <sup>1</sup> sturdy <sup>2</sup> element  
<sup>3</sup> scramble <sup>4</sup> rave \_\_\_\_\_ 10
11. segregate <sup>1</sup> cluster <sup>2</sup> naught  
<sup>3</sup> ginger <sup>4</sup> colonial \_\_\_\_\_ 11
12. bleach <sup>1</sup> badge <sup>2</sup> dell  
<sup>3</sup> dye <sup>4</sup> madman \_\_\_\_\_ 12
13. molten <sup>1</sup> indigo <sup>2</sup> frozen  
<sup>3</sup> frenzy <sup>4</sup> rafter \_\_\_\_\_ 13
14. repel <sup>1</sup> staple <sup>2</sup> poisonous  
<sup>3</sup> motto <sup>4</sup> attract \_\_\_\_\_ 14
15. transparent <sup>1</sup> inclination <sup>2</sup> opaque  
<sup>3</sup> studied <sup>4</sup> shawl \_\_\_\_\_ 15
16. conserve <sup>1</sup> patter <sup>2</sup> expend  
<sup>3</sup> janitor <sup>4</sup> identify \_\_\_\_\_ 16
17. preserve <sup>1</sup> eccentric <sup>2</sup> diary  
<sup>3</sup> soot <sup>4</sup> annihilate \_\_\_\_\_ 17
18. sterile <sup>1</sup> plush <sup>2</sup> minor  
<sup>3</sup> huff <sup>4</sup> fertile \_\_\_\_\_ 18
19. terminal <sup>1</sup> origin <sup>2</sup> faucet  
<sup>3</sup> engraver <sup>4</sup> countess \_\_\_\_\_ 19
20. agitation <sup>1</sup> agnostic <sup>2</sup> cogitation  
<sup>3</sup> quiescent <sup>4</sup> agrarian \_\_\_\_\_ 20
21. septic <sup>1</sup> germ <sup>2</sup> sterile  
<sup>3</sup> tank <sup>4</sup> separate \_\_\_\_\_ 21
22. mutation <sup>1</sup> hereditary <sup>2</sup> environmental  
<sup>3</sup> deaf <sup>4</sup> reduction \_\_\_\_\_ 22
23. analysis <sup>1</sup> shorten <sup>2</sup> synthesis  
<sup>3</sup> concrete <sup>4</sup> amalgamate \_\_\_\_\_ 23

Sec. B. Score (number right).....

**TEST 1. SEC. C**

**Directions:** Underline the word which means the **opposite or about the opposite** of the first word. Write its number on the line to the right.

0. **large** <sup>1</sup> rich <sup>2</sup> small <sup>3</sup> gone <sup>4</sup> away 2 0

- |                  |                          |                          |                     |      |
|------------------|--------------------------|--------------------------|---------------------|------|
| 1. war           | <sup>1</sup> peace       | <sup>2</sup> certain     |                     |      |
|                  |                          | <sup>3</sup> dark        | <sup>4</sup> number | — 1  |
| 2. enemy         | <sup>1</sup> interest    | <sup>2</sup> ally        |                     |      |
|                  | <sup>3</sup> storm       | <sup>4</sup> practice    |                     | — 2  |
| 3. government    | <sup>1</sup> spirit      | <sup>2</sup> increase    |                     |      |
|                  | <sup>3</sup> wheel       | <sup>4</sup> anarchy     |                     | — 3  |
| 4. system        | <sup>1</sup> chaos       | <sup>2</sup> agree       |                     |      |
|                  | <sup>3</sup> beam        | <sup>4</sup> connect     |                     | — 4  |
| 5. freedom       | <sup>1</sup> depart      | <sup>2</sup> subjection  |                     |      |
|                  | <sup>3</sup> example     | <sup>4</sup> fortune     |                     | — 5  |
| 6. liberty       | <sup>1</sup> glory       | <sup>2</sup> manufacture |                     |      |
|                  | <sup>3</sup> captivity   | <sup>4</sup> standard    |                     | — 6  |
| 7. citizen       | <sup>1</sup> slope       | <sup>2</sup> operation   |                     |      |
|                  | <sup>3</sup> alien       | <sup>4</sup> divine      |                     | — 7  |
| 8. majority      | <sup>1</sup> minority    | <sup>2</sup> equity      |                     |      |
|                  | <sup>3</sup> beggar      | <sup>4</sup> forge       |                     | — 8  |
| 9. publish       | <sup>1</sup> decay       | <sup>2</sup> suppress    |                     |      |
|                  | <sup>3</sup> most        | <sup>4</sup> wax         |                     | — 9  |
| 10. conquest     | <sup>1</sup> strain      | <sup>2</sup> defeat      |                     |      |
|                  | <sup>3</sup> salary      | <sup>4</sup> process     |                     | — 10 |
| 11. interior     | <sup>1</sup> rage        | <sup>2</sup> scorn       |                     |      |
|                  | <sup>3</sup> exterior    | <sup>4</sup> relate      |                     | — 11 |
| 12. assault      | <sup>1</sup> countenance | <sup>2</sup> delivery    |                     |      |
|                  | <sup>3</sup> protect     | <sup>4</sup> festival    |                     | — 12 |
| 13. lawful       | <sup>1</sup> naught      | <sup>2</sup> quote       |                     |      |
|                  | <sup>3</sup> reprove     | <sup>4</sup> illegal     |                     | — 13 |
| 14. organization | <sup>1</sup> dissolution | <sup>2</sup> spill       |                     |      |
|                  | <sup>3</sup> ripple      | <sup>4</sup> theme       |                     | — 14 |
| 15. challenge    | <sup>1</sup> thimble     | <sup>2</sup> indulge     |                     |      |
|                  | <sup>3</sup> defend      | <sup>4</sup> harbinger   |                     | — 15 |
| 16. corruption   | <sup>1</sup> lowly       | <sup>2</sup> integrity   |                     |      |
|                  | <sup>3</sup> cravat      | <sup>4</sup> racketeer   |                     | — 16 |
| 17. boss         | <sup>1</sup> mortgage    | <sup>2</sup> quill       |                     |      |
|                  | <sup>3</sup> scan        | <sup>4</sup> employee    |                     | — 17 |
| 18. descendant   | <sup>1</sup> scenery     | <sup>2</sup> ascent      |                     |      |
|                  | <sup>3</sup> ancestor    | <sup>4</sup> volunteer   |                     | — 18 |
| 19. opponent     | <sup>1</sup> wallet      | <sup>2</sup> assistant   |                     |      |
|                  | <sup>3</sup> tenant      | <sup>4</sup> radical     |                     | — 19 |
| 20. honesty      | <sup>1</sup> fraud       | <sup>2</sup> strenuous   |                     |      |
|                  | <sup>3</sup> prior       | <sup>4</sup> indifferent |                     | — 20 |
| 21. prohibition  | <sup>1</sup> reduction   | <sup>2</sup> phosphorus  |                     |      |
|                  | <sup>3</sup> minion      | <sup>4</sup> toleration  |                     | — 21 |
| 22. neutrality   | <sup>1</sup> millinery   | <sup>2</sup> controversy |                     |      |
|                  | <sup>3</sup> leaves      | <sup>4</sup> hereditary  |                     | — 22 |
| 23. truce        | <sup>1</sup> hobble      | <sup>2</sup> flier       |                     |      |
|                  | <sup>3</sup> campaign    | <sup>4</sup> economic    |                     | — 23 |

**Sec. C. Score (number right)**.....

**TEST 1. SEC. D**

**Directions:** Underline the word which means the opposite or about the opposite of the first word. Write its number on the line to the right.

0. **large** <sup>1</sup> rich <sup>2</sup> small <sup>3</sup> gone <sup>4</sup> away <sup>2</sup> 0

- |                       |                         |                       |                          |                           |          |
|-----------------------|-------------------------|-----------------------|--------------------------|---------------------------|----------|
| 1. <b>cause</b>       | <sup>1</sup> effect     | <sup>2</sup> against  | <sup>3</sup> certain     | <sup>4</sup> cold         | _____ 1  |
| 2. <b>present</b>     | <sup>1</sup> number     | <sup>2</sup> milk     | <sup>3</sup> absent      | <sup>4</sup> front        | _____ 2  |
| 3. <b>direct</b>      | <sup>1</sup> afraid     | <sup>2</sup> indirect | <sup>3</sup> loud        | <sup>4</sup> health       | _____ 3  |
| 4. <b>perfect</b>     | <sup>1</sup> stood      | <sup>2</sup> manner   | <sup>3</sup> equal       | <sup>4</sup> imperfect    | _____ 4  |
| 5. <b>final</b>       | <sup>1</sup> original   | <sup>2</sup> caught   | <sup>3</sup> meal        | <sup>4</sup> establish    | _____ 5  |
| 6. <b>oppose</b>      | <sup>1</sup> standard   | <sup>2</sup> gobble   | <sup>3</sup> serve       | <sup>4</sup> drove        | _____ 6  |
| 7. <b>unusual</b>     | <sup>1</sup> drown      | <sup>2</sup> meadow   | <sup>3</sup> assure      | <sup>4</sup> common       | _____ 7  |
| 8. <b>convict</b>     | <sup>1</sup> combine    | <sup>2</sup> free     | <sup>3</sup> prejudice   | <sup>4</sup> moral        | _____ 8  |
| 9. <b>pit</b>         | <sup>1</sup> tumble     | <sup>2</sup> peak     | <sup>3</sup> reduce      | <sup>4</sup> compel       | _____ 9  |
| 10. <b>worthless</b>  | <sup>1</sup> add        | <sup>2</sup> credit   | <sup>3</sup> instruct    | <sup>4</sup> merit        | _____ 10 |
| 11. <b>esteem</b>     | <sup>1</sup> blame      | <sup>2</sup> factory  | <sup>3</sup> guilty      | <sup>4</sup> pitch        | _____ 11 |
| 12. <b>falter</b>     | <sup>1</sup> execute    | <sup>2</sup> unity    | <sup>3</sup> fern        | <sup>4</sup> girdle       | _____ 12 |
| 13. <b>reverence</b>  | <sup>1</sup> loaf       | <sup>2</sup> dishonor | <sup>3</sup> philosopher | <sup>4</sup> screen       | _____ 13 |
| 14. <b>agreement</b>  | <sup>1</sup> scripture  | <sup>2</sup> stag     | <sup>3</sup> discord     | <sup>4</sup> tinkle       | _____ 14 |
| 15. <b>positive</b>   | <sup>1</sup> peel       | <sup>2</sup> namely   | <sup>3</sup> negative    | <sup>4</sup> lonesome     | _____ 15 |
| 16. <b>definite</b>   | <sup>1</sup> indulge    | <sup>2</sup> gobble   | <sup>3</sup> escort      | <sup>4</sup> indefinite   | _____ 16 |
| 17. <b>progress</b>   | <sup>1</sup> dizzy      | <sup>2</sup> concrete | <sup>3</sup> caravan     | <sup>4</sup> decline      | _____ 17 |
| 18. <b>initial</b>    | <sup>1</sup> hustle     | <sup>2</sup> terminal | <sup>3</sup> fraught     | <sup>4</sup> eddy         | _____ 18 |
| 19. <b>hypocrisy</b>  | <sup>1</sup> cooky      | <sup>2</sup> chide    | <sup>3</sup> fidelity    | <sup>4</sup> blithe       | _____ 19 |
| 20. <b>criticism</b>  | <sup>1</sup> infest     | <sup>2</sup> coupling | <sup>3</sup> feud        | <sup>4</sup> commendation | _____ 20 |
| 21. <b>revelation</b> | <sup>1</sup> filial     | <sup>2</sup> moulder  | <sup>3</sup> disguise    | <sup>4</sup> sorcery      | _____ 21 |
| 22. <b>intricate</b>  | <sup>1</sup> efficiency | <sup>2</sup> delicacy | <sup>3</sup> simple      | <sup>4</sup> clay         | _____ 22 |

**Sec. D. Score (number right)**.....

## TEST 2. SEC. E

Read the following directions. Do as you are told in each case. Underline the answer and write the number (or letter) of the answer on the line to the right.

1. Read the following names:

Mary Louis Roger Elizabeth

The first letters of the boys names are

<sup>1</sup> ML    <sup>2</sup> RE    <sup>3</sup> LR    <sup>4</sup> ME

Write the number of the answer here: \_\_\_\_\_ 1

2. Read these numbers:

5 1 0 6 7 4 5 9 8 0

The third number after the six is

<sup>a</sup> 7    <sup>b</sup> 5    <sup>c</sup> 9    <sup>d</sup> 1

Write the letter of the answer here: \_\_\_\_\_ 2

3. The area of a triangle is found by multiplying  $\frac{1}{2}$  the base by the altitude. Find the area, or the number of square feet, in a triangle which has a base of 4 feet and an altitude of 3 feet. The answer is

<sup>a</sup> 6    <sup>b</sup> 12    <sup>c</sup> 4    <sup>d</sup> 2

\_\_\_\_\_ 3

4. Latitude is the distance north or south from the equator. In the following ship's reading, the letter preceding the statement which indicates latitude is

(a) West 8° 24' 20"

(b) North 2° 48' 10"

(c) East 10° 19' 30"

\_\_\_\_\_ 4

5. American is the proper adjective derived from the proper noun America. The number of the word which is the proper adjective of the proper noun Arabia is

<sup>1</sup> Arabia's    <sup>2</sup> Arabia    <sup>3</sup> Arabian

\_\_\_\_\_ 5

6. Regular adverbs are formed by adding *ly* to the adjectives, such as beautiful, beautifully. The number of the word which gives the adverb formed by the regular adjective sweet is

<sup>1</sup> sweetly    <sup>2</sup> sweetest    <sup>3</sup> sweeter

\_\_\_\_\_ 6

7. The word *full* used as a suffix drops one *l*; as *cup*, *cupful*. The number of the word which has the word *full* added as a suffix to the word *mouth* is

<sup>1</sup> full    <sup>2</sup> mouthful    <sup>3</sup> mouth    full

\_\_\_\_\_ 7

8. Nouns ending in *y*, when the *y* is preceded by a vowel, form the plural regularly by adding *s*; as, *monkey*, *monkeys*. The number of the word which forms the plural of *donkey* is

<sup>1</sup> Donkeys    <sup>2</sup> Donkey    <sup>3</sup> Donkey's

\_\_\_\_\_ 8

9. Read the following recipe:

2 cups flour

$\frac{1}{2}$  cup lard

1 teaspoonful salt

1 cup milk

2 teaspoonfuls baking powder

Take the flour, salt, and baking powder and sift together; mix in the lard thoroughly; add the milk; roll the dough out about one-half inch thick and cut with a biscuit cutter. Bake in a hot oven about twelve minutes. The number of the item which is the fourth thing to be used in mixing the above recipe is

<sup>1</sup> milk    <sup>2</sup> lard    <sup>3</sup> salt

<sup>4</sup> baking powder

\_\_\_\_\_ 9

10. The length of the diagonal line in a rectangle is found by adding the square of the base to the square of the altitude and then extracting the square root of this sum. The letter which indicates the length in inches of the diagonal of a rectangle whose base is 8 inches and whose altitude is 6 inches is (Eight squared is 64, 6 squared is 36, and 10 is the square root of 100.)

<sup>a</sup> 6    <sup>b</sup> 8    <sup>c</sup> 10    <sup>d</sup> 36

\_\_\_\_\_ 10

Go right on to the next column.

Sec. E. Score (number right).....



## TEST 2. SEC. F

**Directions:** Underline the correct answer. Write its number (or letter) on the line to the right.

1. The introduction is found in what part of the book?  
 1 beginning    2 middle    3 end    \_\_\_\_\_ 1
2. The appendix is found in what part of the book?  
 1 beginning    2 middle    3 end    \_\_\_\_\_ 2
3. A glossary contains:  
 1 index    2 definitions    3 pictures    \_\_\_\_\_ 3
4. The bibliography is found in what part of the book or chapter?  
 1 beginning    2 middle    3 end    \_\_\_\_\_ 4
5. A preface is found in what part of the book?  
 1 beginning    2 middle    3 end    \_\_\_\_\_ 5

Look at the following:

### TABLE OF CONTENTS

Chapter	Page
1. The Vastness of the Industry.....	1
2. Methods of Handling.....	25
3. Land and Water Transport.....	40
4. Chicago's Stockyards .....	55
5. The Embargo .....	60
6. Reindeer Meat .....	70
7. Imported Meat .....	77

6. On what page does "Methods of Handling" begin?  
 a 1    b 25    c 40    d 55    \_\_\_\_\_ 6
7. Which of these stories is on page 75?  
 1 Reindeer Meat.  
 2 The Embargo.  
 3 Imported Meat.    \_\_\_\_\_ 7

Go right on to the next column.

**Directions:** Look at this index and find the answers to questions 8, 9, and 10.

### INDEX

- France: Advantages of climate and surface of, 298-99; cities of, 301-2; foreign possessions of, 298, 349-51; industries and manufacturing, 300; location of, 298; people of, 300; problems of, 302-3; transportation in, 299.
- French Africa, problems of, 351.
- French Equatorial Africa: location of, 380; products of, 350.
- French Guiana, 251.
- French Indo-China: capital of, 393; industries of, 392; problems of its people, 393.
- French Somaliland, 350, 355.
- 
8. Information concerning French Guiana will be found on what page?  
 a 298-99    b 351    c 251    d 355    \_\_\_\_\_ 8
  9. Information concerning manufacturing in France will be found on what page?  
 a 298-99    b 301-2    c 300    d 299    \_\_\_\_\_ 9
  10. Information concerning products of French Equatorial Africa will be found on what page?  
 a 380    b 351    c 355    d 350    \_\_\_\_\_ 10
- Underline the **two** best topics to look up in an encyclopedia or reference book for information on the following subjects. Write the **two numbers** on the line to the right.
11. Raising Sheep in Australia  
 1 Australia    2 Animal Husbandry  
 3 Sheep    4 Farming    5 Meat    \_\_\_\_\_ 11
  12. Rubber Plantations in Brazil  
 1 Automobile Tires    2 Plantations  
 3 Rubber    4 Brazil  
 5 South America    \_\_\_\_\_ 12
  13. Communication by Radio  
 1 Telephone    2 Radio    3 Cables  
 4 Inventors    5 Wireless    \_\_\_\_\_ 13
  14. Destructive Insects in the Citrus Industry  
 1 Horticulture  
 2 Industry    3 Citrus Fruit  
 4 Destruction    5 Pests    \_\_\_\_\_ 14
  15. The Baseball Game in America  
 1 Schools    2 Big League  
 3 Baseball    4 Games    5 America    \_\_\_\_\_ 15

Sec. F. Score (number right).....

## TEST 2. SEC. G

Read this story:

After the Revolutionary War, America was thrown upon her own economic and social resources. Some of the problems are particularly well illustrated by the textile industry.

In the early days it was difficult for America to make much progress or to compete with England in this field. England would not allow machinery or models of machines to be exported, and discouraged their skilled mechanics from leaving their own country. However, in 1789, Samuel Slater, who had previously worked in an English factory, came to Rhode Island and built the first power cotton spinning mill in America. He has been called the "Father of American Manufacturing."

Even with the aid of such a man as Slater the textile industry developed very slowly. Fifteen years after the first cotton mill was built, there were only four cotton mills in America. The passing of the Embargo Act of 1807 and the War of 1812 stimulated manufacturing temporarily, but the close of the War of 1812 was followed by a slump in American industry which gave rise to additional protective tariff laws.

During the Civil War, manufacturing of textiles was greatly hindered because of lack of raw materials. However, after 1865 a new industrial era began. Many mechanical improvements were made and "mass production" was instituted. Before long the United States had advanced to first rank among textile-producing nations. She has held this position until recent years, when foreign competition appears to have become a very important factor.

Draw a line under the correct answer. Write its number on the line to the right.

1. The best title for the story is  
<sup>1</sup> textiles    <sup>2</sup> raw materials  
<sup>3</sup> communication    \_\_\_\_\_ 1
2. Samuel Slater built a  
<sup>1</sup> cotton gin    <sup>2</sup> telegraph  
<sup>3</sup> spinning mill    \_\_\_\_\_ 2
3. In 1805, there were the following number of cotton mills  
<sup>1</sup> two    <sup>2</sup> four    <sup>3</sup> ten    <sup>4</sup> twenty    \_\_\_\_\_ 3

Go right on to the next column.

## TEST 2. SEC. G (Continued)

4. The Embargo Act of 1807 was a  
<sup>1</sup> treaty    <sup>2</sup> restriction  
<sup>3</sup> amendment    \_\_\_\_\_ 4
5. Mechanical improvements were responsible for  
<sup>1</sup> no production    <sup>2</sup> limited production  
<sup>3</sup> mass production    \_\_\_\_\_ 5
6. The textile industry includes  
<sup>1</sup> mining    <sup>2</sup> agriculture  
<sup>3</sup> manufacture of cloth    \_\_\_\_\_ 6
7. England affected the early development of the textile industry in the United States by  
<sup>1</sup> encouragement    <sup>2</sup> hindrance  
<sup>3</sup> financing    \_\_\_\_\_ 7

Read this story:

The fish is the lowest of the five large classes of vertebrates. The principal characteristics of a fish are: It is cold-blooded, breathes by means of gills, lays eggs, and lives in the water. It has a bony skeleton and a wedge-shaped body which is covered with overlapping scales. There are, however, numerous variations from the typical fish. For example, the catfish has no scales, the climbing perch can climb trees, and the flying fish can rise out of the water for gliding flight.

At the present time there are about 13,000 known species of fish found in great abundance and variety in oceans, lakes, and rivers throughout the world. Records show that, in a single year, the number of fresh fish and shell fish caught in the five leading states and territories of the United States was as follows:

California .....	851,388,000	27.4
Alaska .....	642,498,000	20.7
Massachusetts .....	446,545,000	14.4
Maine .....	162,700,000	5.2
Washington .....	152,224,000	4.9
Others .....	842,397,000	27.4
Total .....	3,097,752,000	100.0

Many varieties of fish are of great economic value. Such fish as salmon and tuna are very popular and are therefore more expensive, even though they do not have as high food value as cheaper fish, such as herring, cod, and mackerel. These cheaper fish compare

Go right on to the next page.

## TEST 2. SEC. G (Continued)

favorably in food value with beef and mutton. Aside from food value, there are many by-products in commercial fishing, such as the various kinds of fish oils, glue, gelatine, isinglass, fertilizers, and leather.

Draw a line under the correct answer. Write its number on the line to the right. You may look back to find the answer.

8. The best title for this story is:  
  - <sup>1</sup> Origin of fish
  - <sup>2</sup> Commercial fishing
  - <sup>3</sup> Fish
 \_\_\_\_\_ 8
9. The fish is a  
  - <sup>1</sup> variation
  - <sup>2</sup> vertebrate
  - <sup>3</sup> biped
 \_\_\_\_\_ 9
10. "Known species" means  
  - <sup>1</sup> money
  - <sup>2</sup> samples
  - <sup>3</sup> varieties
 \_\_\_\_\_ 10
11. The third state or territory in amount of commercial fishing was the state of  
  - <sup>1</sup> California
  - <sup>2</sup> Massachusetts
  - <sup>3</sup> Maine
 \_\_\_\_\_ 11
12. About 20 per cent of the fish were caught in  
  - <sup>1</sup> Alaska
  - <sup>2</sup> California
  - <sup>3</sup> Maine
 \_\_\_\_\_ 12
13. The fish having the greatest food value is  
  - <sup>1</sup> Tuna
  - <sup>2</sup> Salmon
  - <sup>3</sup> Mackerel
 \_\_\_\_\_ 13
14. One of the by-products of the fish is  
  - <sup>1</sup> Rubber
  - <sup>2</sup> Isinglass
  - <sup>3</sup> Wood
 \_\_\_\_\_ 14

Read this story:

The railroad has had its most rapid and largest development in the United States, even though the locomotive was invented in England. Railroad companies were organized in the United States in 1826, and locomotives were first run in 1830. These early railroads were operated on a small scale and connected only the larger cities of the Atlantic seaboard.

Since its beginning, railroad construction has been carried on periodically. During the decade preceding the Civil War there was very active building in the South. At this time railroads were built between the Allegheny mountains and the Mississippi river. After the Civil War there was very little construction until 1868, at which time there be-

Go right on to the next column.

## TEST 2. SEC. G (Continued)

gan a great activity for a period of five years. This resulted in an over-expansion of railroad lines in the far West and the middle West. The principal railroads in the United States had been completed by 1890, and all additional construction merely supplemented previously built lines. Since 1920 there has been an abandonment of certain lines, so that at this time there is an actual reduction of mileage in the railway transportation system.

The development of the railroad has been one of the principal factors in the economic and social revolution. It has provided wider contacts, a better system for distribution of products, and a greater variety of materials. With accurate train schedules and quick delivery service, the merchant does not need to carry a large stock of supplies, but may conduct his business with a smaller amount of capital. Improvement in transportation facilities has given man a wider field of interest and otherwise has been an important factor in the growth of our country.

Draw a line under the correct answer. Write its number on the line to the right.

15. The best title for this story is:  
  - <sup>1</sup> Invention of locomotives
  - <sup>2</sup> Transportation systems
  - <sup>3</sup> Railroads
 \_\_\_\_\_ 15
16. The locomotive was invented in  
  - <sup>1</sup> England
  - <sup>2</sup> United States
  - <sup>3</sup> France
 \_\_\_\_\_ 16
17. The principal railroad lines had been constructed by  
  - <sup>1</sup> 1868
  - <sup>2</sup> 1890
  - <sup>3</sup> 1885
 \_\_\_\_\_ 17
18. Railroad construction in the United States has been  
  - <sup>1</sup> steady
  - <sup>2</sup> systematic
  - <sup>3</sup> irregular
 \_\_\_\_\_ 18
19. Transportation facilities in 1826 were  
  - <sup>1</sup> good
  - <sup>2</sup> fair
  - <sup>3</sup> poor
 \_\_\_\_\_ 19
20. Better transportation facilities enabled merchants to conduct their business with  
  - <sup>1</sup> less capital
  - <sup>2</sup> about the same capital
  - <sup>3</sup> more capital
 \_\_\_\_\_ 20

Go right on to the next page.

## TEST 2. SEC. G (Continued)

Read this story:

### THE TELEGRAPH

For eleven years Samuel Morse had been trying to interest someone in his invention of the telegraph, and endured great poverty in attempting to carry out the experimentation. Finally, in 1843, Congress appropriated \$30,000.00 for this purpose, and Morse was enabled to make rapid progress in the development of telegraphy.

In the spring of 1844, when the political parties were holding their conventions, the telegraph was ready for practical application. He was able to notify the candidates and the people in Washington of the results of the conventions before they were able to secure the information otherwise. This aroused public interest, and there was a general realization of the remarkable accomplishment. From that time forward the telegraph system grew with astounding rapidity, and covered the entire world within thirty years.

At first the telegraph was mechanically complicated, but with constant research the instruments became simpler. During recent times, however, with the complexities of modern life, the system has become somewhat involved. Every city has an intricate system of telegraph wires underneath the surface of the streets, and even the continents are connected by cables in the ocean.

The development of the telegraph has brought the world closer together by providing a method whereby ideas and messages of the entire world may be brought within the reach of all in a minimum of time. This process has been greatly accelerated by recent improvements in wireless telegraphy.

Write the number of the correct answer on the line to the right.

21. An appropriation consists of  
 1 congratulations 2 money  
 3 inventions \_\_\_\_\_21
22. An intricate system is  
 1 complicated 2 antique 3 radical \_\_\_\_\_22

Go right on to the next column.

## TEST 2. SEC. G (Continued)

Read the eight statements below. You are to select the best title for each of the four paragraphs of the story. Write its number on the line to the right.

### STATEMENTS

1. Wider use of telegraphy
  2. Communication of words
  3. The inventor's struggle
  4. Congress and elections
  5. Effects of telegraphy
  6. Ideas and messages
  7. The practical demonstration
  8. Necessity
23. The best title for the first paragraph is statement:  
 1 2 3 4 5 \_\_\_\_\_23
24. The best title for the second paragraph is statement:  
 4 5 6 7 8 \_\_\_\_\_24
25. The best title for the third paragraph is statement:  
 1 2 3 4 5 \_\_\_\_\_25
26. The best title for the fourth paragraph is:  
 4 5 6 7 8 \_\_\_\_\_26

The following items or things are mentioned in the story:

Complex system  
 Mechanically complicated instruments  
 Wireless telegraphy  
 Simpler instruments

The order in which these developments occurred is as follows:

27. Complex system was:  
 1st 2nd 3rd 4th \_\_\_\_\_27
28. Mechanically complicated instruments were:  
 1st 2nd 3rd 4th \_\_\_\_\_28
29. Wireless telegraphy was:  
 1st 2nd 3rd 4th \_\_\_\_\_29
30. Simpler instruments were:  
 1st 2nd 3rd 4th \_\_\_\_\_30

Stop Here

Sec. G. Score (number right).....

### TEST 3. SEC. A

Write each of these amounts on the line to the right, using numbers, like the sample.

0. Twelve 12 0  
 1. Eight hundred forty-five. \_\_\_\_\_ 1  
 2. Five thousand twenty. \_\_\_\_\_ 2  
 3. Ten thousand sixty-four. \_\_\_\_\_ 3  
 4. One million ten thousand eleven. \_\_\_\_\_ 4  
 5. Five-sixths. \_\_\_\_\_ 5  
 6. Ninety-nine dollars and five cents. \_\_\_\_\_ 6  
 7. Fifty-five per cent. \_\_\_\_\_ 7

Draw a line under the correct number. Write it on the line to the right.

8. LXX means 20 30 70 90 \_\_\_\_\_ 8  
 9. DCC means 200 400 600 700 \_\_\_\_\_ 9  
 10. M means 500 1,000 4,000 6,000 \_\_\_\_\_ 10

Draw a line under the largest number and write it on the line to the right.

- 45 200 156 80 \_\_\_\_\_ 11  
 $89\frac{3}{4}$   $66\frac{1}{2}$   $106\frac{5}{6}$   $55\frac{2}{3}$  \_\_\_\_\_ 12  
 .025 .099 .75 .015 \_\_\_\_\_ 13  
 $\frac{5}{6}$   $\frac{3}{4}$   $\frac{7}{8}$   $\frac{2}{3}$  \_\_\_\_\_ 14  
 $\frac{3}{4}$   $(\frac{3}{4})^2$   $(\frac{2}{3})^4$   $(\frac{7}{8})^3$  \_\_\_\_\_ 15

Sec. A. Score (number right).....

### TEST 3. SEC. B

Write the correct answer on the line to the right.

1.  $\sqrt{64}$  \_\_\_\_\_ 1  
 2. 10% of 50 = \_\_\_\_\_ 2  
 3. A right angle equals how many degrees? \_\_\_\_\_ 3  
 4. What are the factors of 15? \_\_\_\_\_ 4  
 5. What is the greatest common divisor of 9, 18, and 27? \_\_\_\_\_ 5

Draw a line under the correct word. Write its letter on the line to the right.

6.  $\pi$  means (a) add (b) pi  
 (c) radius (d) degree \_\_\_\_\_ 6  
 7. % means (a) per cent (b) subtract  
 (c) dram (d) dollar \_\_\_\_\_ 7  
 8. ° means (a) multiply (b) degree  
 (c) per cent (d) divide \_\_\_\_\_ 8  
 9.  $\sqrt{\quad}$  means (a) add (b) ounce  
 (c) interest (d) square root \_\_\_\_\_ 9  
 10.  $\Delta$  means (a) square (b) triangle  
 (c) circle (d) octagon \_\_\_\_\_ 10

Go right on to the next column.

These are rules used in measurement:

- Rule 1. Multiply  $\frac{1}{2}$  base by altitude.  
 Rule 2. Multiply diameter by 3.1416.  
 Rule 3. Multiply width by length.  
 Rule 4. Divide area by width.  
 Rule 5. Multiply length by width by height.

Write the number of the rule which is used to find:

- Volume of a prism \_\_\_\_\_ 11  
 Area of a rectangle \_\_\_\_\_ 12  
 Length of a rectangle \_\_\_\_\_ 13  
 Circumference of a circle \_\_\_\_\_ 14  
 Area of a triangle \_\_\_\_\_ 15

Sec. B. Score (number right).....

### TEST 3. SEC. C

Work these problems and write the answer on the line to the right.

1. Add:  $\begin{array}{r} 72 \\ -31 \\ \hline 28 \end{array}$  \_\_\_\_\_ 1  
 2. Subtract:  $\begin{array}{r} 45 \text{ d} \\ -28 \text{ d} \\ \hline \end{array}$  \_\_\_\_\_ 2  
 3. The minuend is 8; the subtrahend is 12; the difference is: \_\_\_\_\_ 3  
 4. Multiply:  $4(-8)$  \_\_\_\_\_ 4  
 5. Divide:  $\begin{array}{r} -24 \\ \hline 8 \end{array}$  \_\_\_\_\_ 5

Find the value of x in each of these equations. Write each answer on the line to the right.

6.  $8x = 40$  \_\_\_\_\_ 6  
 7.  $x + 5 = 12$  \_\_\_\_\_ 7  
 8.  $x^2 = 81$  \_\_\_\_\_ 8  
 9.  $\frac{x}{2} = 8$  \_\_\_\_\_ 9  
 10. If  $a = 4$ ,  $b = 6$ ,  $c = 2$ , find the value of x in the following equation.  
 $x = a + b - c$  \_\_\_\_\_ 10

Sec. C. Score (number right).....

### TEST 3. SEC. D

**Directions:** Work these problems. Write each answer on the line to the right.

1. In a class room there were 6 rows of desks with 7 desks in each row. Four desks were removed from the room. How many desks were left?  
\_\_\_\_\_ 1
2. Jack bought a used automobile for \$75.00. He paid \$15.00 down and is to pay the rest in twelve equal payments. How much will each payment be?  
\_\_\_\_\_ 2
3. May weighs 95 pounds, Sally weighs 85 pounds, and Jane weighs 120 pounds. What is their average weight in pounds?  
\_\_\_\_\_ 3
4. How many square feet are there in a schoolroom blackboard which is 4 feet wide and 12 feet long?  
\_\_\_\_\_ 4
5. A box is 10 inches long, 6 inches wide, and 4 inches deep. How many cubic inches does it contain?  
\_\_\_\_\_ 5
6. Find the area of a parallelogram having a base of 20 in. and an altitude of 8 in.  
\_\_\_\_\_ 6
7. Find the area of a triangle having a base of 20 in. and an altitude of 12 in.  
\_\_\_\_\_ 7
8. When the scale of a map is " $\frac{1}{4}$  in. = 20 mi." how many miles apart are two cities that are represented on a map as  $1\frac{1}{2}$  in. apart?  
\_\_\_\_\_ 8

Go right on to the next column.

9. Dick, Harry, and James together received \$50.00. Dick received \$15.00, Harry received \$25.00, and James received \$10.00. What per cent of the \$50.00 did each receive?  

Dick\_\_\_\_\_
   
 Harry\_\_\_\_\_
   
 James\_\_\_\_\_ 9
10. Frank earned \$16.00 and saved \$8.00 of it. What per cent did he save?  
\_\_\_\_\_ 10
11. A man received seven per cent interest on a loan of \$200.00 for one year. How much interest did he receive?  
\_\_\_\_\_ 11
12. Helen missed 3 problems on a test but did 85% of them correctly. How many problems were there in the test?  
\_\_\_\_\_ 12
13. John sold brushes at \$1.50 each and received a commission of 30% of his sales. How much did he make on each brush sold?  
\_\_\_\_\_ 13
14. A wooden building, valued at \$12,500 was insured for 80% of its value. The rate of insurance was 24 cents per \$100. What was the amount of the premium?  
\_\_\_\_\_ 14
15. Mary's father has a furniture store. The list price of a chair is \$50.00 and two discounts are given, one of 20% and another of 10%. What did the chair cost Mary's father?  
\_\_\_\_\_ 15

Sec. D. Score (number right).....

# TEST 4. SEC. E

These are problems in addition. Write your answers under the problems and also on the lines to the right.

- (1) 
$$\begin{array}{r} 236 \\ +423 \\ \hline \end{array}$$
 \_\_\_\_\_ 1
- (2) 
$$\begin{array}{r} 307 \\ +430 \\ \hline \end{array}$$
 \_\_\_\_\_ 2
- (3) 
$$\begin{array}{r} 27 \\ +25 \\ \hline \end{array}$$
 \_\_\_\_\_ 3
- (4) 
$$\begin{array}{r} 25 \\ 42 \\ 33 \\ +72 \\ \hline \end{array}$$
 \_\_\_\_\_ 4
- (5) 
$$\begin{array}{r} 3271 \\ 9468 \\ 1345 \\ +701 \\ \hline \end{array}$$
 \_\_\_\_\_ 5
- (6) 
$$\begin{array}{r} \$56.35 \\ 3.68 \\ 12.75 \\ +8.15 \\ \hline \end{array}$$
 \_\_\_\_\_ 6
- (7) 
$$\begin{array}{r} 3 \text{ yd. } 2 \text{ ft. } 8 \text{ in.} \\ +2 \text{ yd. } 1 \text{ ft. } 6 \text{ in.} \\ \hline \end{array}$$
 \_\_\_\_\_ 7
- (8)  $\$20.00 + \$2.25 + \$2 + \$1.75 =$  \_\_\_\_\_ 8
- (9) 
$$\begin{array}{r} \frac{1}{4} \\ +\frac{1}{4} \\ \hline \end{array}$$
 \_\_\_\_\_ 9
- (10) 
$$\begin{array}{r} \frac{1}{4} \\ +\frac{1}{8} \\ \hline \end{array}$$
 \_\_\_\_\_ 10
- (11) 
$$\begin{array}{r} 12 \\ +2\frac{3}{4} \\ \hline \end{array}$$
 \_\_\_\_\_ 11
- (12) 
$$\begin{array}{r} 2\frac{2}{3} \\ +2\frac{1}{6} \\ \hline \end{array}$$
 \_\_\_\_\_ 12
- (13) 
$$\begin{array}{r} 12\frac{1}{4} \\ +3\frac{1}{8} \\ \hline \end{array}$$
 \_\_\_\_\_ 13
- (14) 
$$\begin{array}{r} 3\frac{5}{6} \\ +2\frac{1}{4} \\ \hline \end{array}$$
 \_\_\_\_\_ 14
- (15) 
$$\begin{array}{r} 53\frac{1}{2} \\ 12\frac{2}{3} \\ +32\frac{3}{4} \\ \hline \end{array}$$
 \_\_\_\_\_ 15
- (16)  $6\frac{1}{2} + 6.5 =$  \_\_\_\_\_ 16
- (17)  $18\frac{5}{8} + 12.15 =$  \_\_\_\_\_ 17
- (18)  $.05 + .164 + .2108 =$  \_\_\_\_\_ 18
- (19)  $33.4 + 6.21 + .0382 + 8 =$  \_\_\_\_\_ 19
- (20)  $10\% \text{ of } 60 + 10\% \text{ of } 80 =$  \_\_\_\_\_ 20

Sec. E. Score (number right) \_\_\_\_\_

# TEST 4. SEC. F

These are problems in subtraction. Write your answers under the problems and also on the lines to the right.

- (1) 
$$\begin{array}{r} 387 \\ -252 \\ \hline \end{array}$$
 \_\_\_\_\_ 1
- (2) 
$$\begin{array}{r} 458 \\ -106 \\ \hline \end{array}$$
 \_\_\_\_\_ 2
- (3) 
$$\begin{array}{r} 52 \\ -16 \\ \hline \end{array}$$
 \_\_\_\_\_ 3
- (4) 
$$\begin{array}{r} 2460 \\ -1870 \\ \hline \end{array}$$
 \_\_\_\_\_ 4
- (5) 
$$\begin{array}{r} 8507 \\ -2939 \\ \hline \end{array}$$
 \_\_\_\_\_ 5
- (6) 
$$\begin{array}{r} \$15.25 \\ -1.65 \\ \hline \end{array}$$
 \_\_\_\_\_ 6
- (7)  $\$200 - \$14.25 =$  \_\_\_\_\_ 7
- (8) 
$$\begin{array}{r} 5 \text{ da. } 8 \text{ hr. } 30 \text{ min.} \\ -4 \text{ da. } 10 \text{ hr. } 40 \text{ min.} \\ \hline \end{array}$$
 \_\_\_\_\_ 8
- (9) 
$$\begin{array}{r} \frac{1}{8} \\ -\frac{1}{8} \\ \hline \end{array}$$
 \_\_\_\_\_ 9
- (10) 
$$\begin{array}{r} \frac{2}{5} \\ -\frac{1}{5} \\ \hline \end{array}$$
 \_\_\_\_\_ 10
- (11) 
$$\begin{array}{r} \frac{3}{4} \\ -\frac{1}{8} \\ \hline \end{array}$$
 \_\_\_\_\_ 11
- (12) 
$$\begin{array}{r} \frac{4}{5} \\ -\frac{1}{4} \\ \hline \end{array}$$
 \_\_\_\_\_ 12
- (13) 
$$\begin{array}{r} 7\frac{3}{7} \\ -6 \\ \hline \end{array}$$
 \_\_\_\_\_ 13
- (14) 
$$\begin{array}{r} 8 \\ -4\frac{1}{4} \\ \hline \end{array}$$
 \_\_\_\_\_ 14
- (15) 
$$\begin{array}{r} 33\frac{1}{8} \\ -11\frac{3}{8} \\ \hline \end{array}$$
 \_\_\_\_\_ 15
- (16)  $30.6 - 5\frac{1}{2} =$  \_\_\_\_\_ 16
- (17)  $55\frac{4}{5} - 12.22 =$  \_\_\_\_\_ 17
- (18)  $86.350 - 24.15 =$  \_\_\_\_\_ 18
- (19)  $57.09 - 7.0435 =$  \_\_\_\_\_ 19
- (20)  $\frac{1}{5} \text{ of } 20 - \frac{1}{4} \text{ of } 12 =$  \_\_\_\_\_ 20

Sec. F. Score (number right) \_\_\_\_\_



## SIVE READING TESTS—INTERMEDIATE BATTERY

## PROGRESSIVE ARITHMETIC TESTS—INTERMEDIATE BATTERY

In fractional answers, credit either common fraction or decimal fraction answers, if correct.

## PROGRESSIVE LANGUAGE TESTS—INTERMEDIATE BATTERY

TEST 1-D	TEST 2-E	TEST 2-E (Cont.)	TEST 2-F	TEST 2-F (Cont.)	TEST 2-G Col. 1 1. 1	TEST 2-G (Cont.)	TEST 2-G (Cont.)	TEST 3-A	TEST 3-B (Cont.)	TEST 3-D	TEST 3-D (Cont.)	TEST 4-E	TEST 4-F	TEST 4-G	TEST 4-H	TEST 5-A	TEST 5-C	TEST 5-D	TEST 5-E	TEST 5-E (Cont.)
1. 1		7. 2 or mouthful	1. 1					1. 845				1. 659				1. (1) W.	1. 2	Nouns		
2. 3	1. 3 or LR							2. 5020		1. 38		2. 737	1. 135	1. 1932	1. 8			park		
3. 2								3. 10064	11. 5				2. 352	2. 1000	2. 10	2. (1) T.	2. 1	afternoon		
4. 4			2. 3					4. 1,010,011	12. 3			3. 52	3. 36	3. 5648	3. 91	3. (1) S. (1) S.	3. 1	children		
5. 1	2. b or 5	8. 1 or donkeys	3. 2					5. %	13. 4			4. 172	4. 590	4. 15,552	4. 106			doves		
6. 3								6. \$99.05	14. 2			5. 5568	5. 38240	5. 15,000	5. 406	4. (1) A L. (1) K.	4. 1	shoulders		
7. 4								7. 55%	15. 1			6. \$13.60	6. 15,000	6. 423,488	6. 30	5. (1) B.	5. 1	Pronouns		
8. 2								8. 70	TEST 3-C	2. \$5.00 or \$5		7. \$80.93	7. \$185.75	7. 19 yd. 6 in. or 19 yd. ½ ft.	7. 75 1½/2	6. (1) O. (1) H.	6. 2	We	1. grocery	16. career
9. 2	3. a or 6							9. 700				8. \$24.00	8. 21 hr. 50 min.	8. 19 yd. 6 in. or 19 yd. ½ ft.	8. 3	7. (1) F. (1) P.	7. 2	which	2. doubt	17. mysterious
10. 4								10. 1000				9. ½	9. 1	9. 1	9. ¼	8. (1) R M (1) S (1) U B.	8. 2	their	3. concert	18. association
11. 1									1. 69	3. 100		10. ½	10. 0	10. ½	10. 7 ½ or 7.5	9. (1) C.	9. 2	Verbs	4. assist	19. column
12. 1									2. 17d	4. 48		11. \$14.00	11. ½	11. ½	11. 1	Possible Score, 15 points	10. 2	walk	5. listened	20. cereal
13. 2									3. —4			12. 20	12. ½	12. ½	12. 2 ½ or 2.5	TEST 5-B	11. No	watch	6. often	21. individual
14. 3	4. (b) or b								4. —32			13. \$ .45 or 45c	13. 1½/20 or .55	13. 18	13. 17 ½		12. No	feed	7. society	22. scissors
15. 3									5. —3	5. 240		14. 6 ½/12	14. 3 ¾	14. 3 ¾/15	14. 2 1½/27		13. Yes	perch	8. whistle	23. yacht
16. 4												15. 98 1½/12	15. 21 ¾	15. 36	15. 100	L. (1) trip, L. (1) said, 1(1) "Where-been"	14. No	Adverbs	9. motion	24. session
17. 4	5. 3 or Arabian	9. 2 or lard							6. 5	6. 160 sq. in.		16. 13	16. 25.1	16. 573	16. 30 1½/12 or 30.9166 or 30.917	L. (1) been? L. (1) "We-lake" L. (1) "We-perch" (1) lake,	15. No	almost	10. elephant	25. evidence
18. 2									7. 7			17. 30.775 or 30 21/40	17. 43.58	17. 114 ¾ or 114.4	17. 300	L. (1) trout, bass, L. (1) said, L. (1) drowning, L. (1) "Sit down"	16. Yes	Conjunctions	11. century	26. prairie
19. 3									8. 9	7. 120 sq. in.		18. 4248	18. 62.2	18. 1913	18. 234	10. (1) "Sit down"	17. No	and	12. supply	27. mosquito
20. 4									9. 16			19. 47.6482	19. 50.0465	19. 1.08	19. 23.4	11. Both quotation marks required for one credit. 12. Four quotation marks required for one credit. 13. Must be single quotes.	18. No	Prepositions	13. investigate	28. apparent
21. 3									10. 8	8. 120		20. 14	20. 1	20. 45	20. 2		19. Yes	in	14. examination	29. campaign
22. 3	6. 1 or sweetly	10. c or 10	7. 1													Possible Score, 10 points	20. No	on	15. improvement	30. magnificent



# TEST 4. SEC. G

These are problems in multiplication. Write your answers under the problems and also on the lines to the right.

$$\begin{array}{r} (1) \\ 322 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} (2) \\ 200 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} (4) \\ 486 \\ \times 32 \\ \hline \end{array}$$

$$\begin{array}{r} (5) \\ 956 \\ \times 40 \\ \hline \end{array}$$

$$\begin{array}{r} (7) \\ 2036 \\ \times 208 \\ \hline \end{array}$$

$$\begin{array}{r} (3) \\ 706 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} (6) \\ 500 \\ \times 30 \\ \hline \end{array}$$

$$\begin{array}{r} (8) \\ 2 \text{ yd. } 5 \text{ ft. } 6 \text{ in.} \\ \times 5 \\ \hline \end{array}$$

$$(9) \quad 4 \times \frac{1}{4} =$$

$$(10) \quad \frac{1}{5} \times \frac{1}{5} =$$

$$(11) \quad \frac{1}{4} \times \frac{4}{5} =$$

$$(12) \quad \frac{2}{3} \times \frac{6}{8} =$$

$$(13) \quad 8 \times 2\frac{1}{4} =$$

$$(14) \quad 8\frac{2}{3} \times \frac{2}{5} =$$

$$(15) \quad 6\frac{3}{4} \times 5\frac{1}{3} =$$

$$\begin{array}{r} (17) \\ 35.75 \\ \times 3\frac{1}{5} \\ \hline \end{array}$$

$$\begin{array}{r} (16) \\ 47\frac{3}{4} \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} (19) \\ 43.2 \\ \times 0.25 \\ \hline \end{array}$$

$$\begin{array}{r} (18) \\ 382.6 \\ \times 5 \\ \hline \end{array}$$

$$(20) \quad 5 \times 30\% \text{ of } 30 =$$

Sec. G. Score (number right).....

# TEST 4. SEC. H

These are problems in division. Write your answers above or to the right of the problems and also on the lines to the right.

$$(1) \quad 4 \overline{)32}$$

$$(2) \quad 6 \overline{)60}$$

$$(3) \quad 5 \overline{)455}$$

$$(4) \quad 4 \overline{)424}$$

$$(5) \quad 22 \overline{)8932}$$

$$(6) \quad 300 \overline{)9000}$$

$$(7) \quad 46 \overline{)3476}$$

$$(8) \quad 1 \div \frac{1}{3} =$$

$$(9) \quad \frac{1}{2} \div 2 =$$

$$(10) \quad 6 \div \frac{4}{5} =$$

$$(11) \quad \frac{2}{3} \div \frac{2}{3} =$$

$$(12) \quad \frac{5}{8} \div \frac{1}{4} =$$

$$(13) \quad 6\frac{2}{3} \div \frac{3}{8} =$$

$$(14) \quad 5\frac{2}{3} \div 2\frac{1}{4} =$$

$$(15) \quad 150 \div 1\frac{1}{2} =$$

$$(16) \quad 3 \overline{)92\frac{3}{4}}$$

$$(17) \quad .03 \overline{)9}$$

$$(18) \quad 3 \overline{)7.02}$$

$$(19) \quad .03 \overline{).702}$$

$$(20) \quad \frac{1}{2} \text{ of } 8 \div \frac{1}{3} \text{ of } 6 =$$

Sec. H. Score (number right).....

## TEST 5. SEC. A

**Directions:** In these sentences draw a line under each letter that should be capitalized. Write the capital letters on the line to the right.

1. we shall travel east to Bagdad. \_\_\_\_\_ 1
2. Mary visited her aunt. they went to a theatre the first evening. \_\_\_\_\_ 2
3. The abbreviation for september is sept. \_\_\_\_\_ 3
4. abraham lincoln was born on a farm in kentucky. \_\_\_\_\_ 4
5. *Black beauty* is the name of a book. \_\_\_\_\_ 5
6. The last day of october is hal-lowe'en. \_\_\_\_\_ 6
7. The capital of france is paris. \_\_\_\_\_ 7
8. I went to the rocky mountains on saturday with uncle bill. \_\_\_\_\_ 8
9. Jack said, "can you play ball today?" \_\_\_\_\_ 9

Sec. A. Score (number right).....

## TEST 5. SEC. B

**Directions:** In the following story write in the periods (.), commas (,), question marks (?), and quotation marks ("") (') that are left out.

On the way back from a fishing trip Jack and Bill met Tom who said Where have you been

We have been fishing up at the lake answered Bill. We caught trout bass and perch.

Jack said "Bill prevented us from drowning too. We were out in the canoe and I stood up. The canoe began tipping and Bill yelled, Sit down, and I sat down just as the canoe was about to tip over."

Sec. B. Score (number right).....

## TEST 5. SEC. C

**Directions:** Draw a line under the correct word and write its number on the line to the right.

1. (<sup>1</sup> Hasn't <sup>2</sup> Haven't) the children come home yet? \_\_\_\_\_ 1
2. (<sup>1</sup> Doesn't <sup>2</sup> Don't) the boy know it is dangerous to go into deep water? \_\_\_\_\_ 2
3. He (<sup>1</sup> did <sup>2</sup> done) the work well. \_\_\_\_\_ 3
4. We were at the theatre last night where we (<sup>1</sup> saw <sup>2</sup> seen) some trained animals. \_\_\_\_\_ 4
5. He should (<sup>1</sup> have gone <sup>2</sup> have went) home before six o'clock. \_\_\_\_\_ 5
6. Put (<sup>1</sup> them <sup>2</sup> those) books on the table. \_\_\_\_\_ 6
7. The cake was given to (<sup>1</sup> he <sup>2</sup> him) and Mary. \_\_\_\_\_ 7
8. Miss Sparks gave the basket of flowers to her and (<sup>1</sup> I <sup>2</sup> me). \_\_\_\_\_ 8
9. (<sup>1</sup> Lay <sup>2</sup> Lie) still and rest until morning. \_\_\_\_\_ 9
10. The ball game started when the mayor (<sup>1</sup> throwed <sup>2</sup> threw) the base ball onto the field. \_\_\_\_\_ 10

**Directions:** If the statements given below are complete sentences draw a line under the word YES, if not, draw a line under the word NO.

11. As these men worked hard the previous day. YES NO 11
12. When the problem is one of addition. YES NO 12
13. The lake was cupped by snow-covered hills. YES NO 13
14. After talking with the natives in the camp. YES NO 14
15. Running as hard as he could. YES NO 15
16. Great caravan routes lead to Damascus. YES NO 16
17. With the first breath of autumn. YES NO 17
18. Which in turn rests on logic. YES NO 18
19. To hold in mind a single line of reasoning requires higher types of thought than those which are involved in mastering a single statement. YES NO 19
20. When the pupil does not understand what he is aiming to accomplish in algebra or geometry and is carried along for a time by the demands of the teacher. YES NO 20

Sec. C. Score (number right).....

## TEST 5. SEC. D

Read the following sentence:

We walk in the park almost every afternoon and watch other small children feed doves which perch on their shoulders.

Classify the words in the above sentence according to parts of speech and list them in the column below.

Nouns	Pronouns	Verbs	Adjectives	Adverbs	Conjunctions	Prepositions

## TEST 5. SEC. E

Sec. D. Score (number right).....

<p>1. ....</p> <p>2. ....</p> <p>3. ....</p> <p>4. ....</p> <p>5. ....</p> <p>6. ....</p> <p>7. ....</p> <p>8. ....</p> <p>9. ....</p> <p>10. ....</p> <p>11. ....</p> <p>12. ....</p> <p>13. ....</p> <p>14. ....</p> <p>15. ....</p>	<p>16. ....</p> <p>17. ....</p> <p>18. ....</p> <p>19. ....</p> <p>20. ....</p> <p>21. ....</p> <p>22. ....</p> <p>23. ....</p> <p>24. ....</p> <p>25. ....</p> <p>26. ....</p> <p>27. ....</p> <p>28. ....</p> <p>29. ....</p> <p>30. ....</p>
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Sec. E. Score (number right).....

TEST 5. SEC. F  
SEC. F. SCORE (See Manual).....

# MANUAL OF DIRECTIONS

## PROGRESSIVE ACHIEVEMENT TESTS—INTERMEDIATE BATTERY

Devised by Ernest W. Tiegs and Willis W. Clark

Note: This Manual contains directions for giving and hand scoring the Intermediate Battery, Progressive Achievement Tests, the Reading test, the Arithmetic test, and the Language test. When separate tests are given, directions may be found on the following pages: Reading, page 3; Arithmetic, page 4; and Language, page 4.

Machine scoring: A special set of directions for giving the above tests is furnished when they are to be machine scored.

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### I. PURPOSE

This is a diagnostic-survey group test in the fundamental skills, designed to measure the extent of pupil mastery in reading vocabulary, reading comprehension, arithmetic reasoning, arithmetic fundamentals, and language in grades seven, eight, and nine. These five major areas are differentiated into twenty-one sub-areas to provide a diagnostic analysis of functional elements in learning in order that learning difficulties may be revealed and serve as the basis of remedial and constructive educational guidance on the part of the teacher.

Some of the significant features of the test are as follows:

1. It is organized to test abilities and skills which in themselves constitute major objectives in these grades and which, in addition, are of significant importance as the tools of further learning.
2. The items included in this test were selected and developed on the basis of careful studies of the objectives of the curricula of these grades in modern educational systems.
3. It provides a profile which reveals graphically the pupil's achievement for his grade placement without any computation on the part of the teacher.
4. It provides a diagnostic analysis of over one-hundred essential functional elements which may be responsible for learning difficulties.
5. In addition to its diagnostic features for the guidance of learning, it provides the normative information usually furnished by survey or inventory tests; results may be used to determine the success with which classes, schools, and school systems (as well as individual pupils) are attaining the objectives of the curriculum.
6. Because of the wide range of ability and achievement represented in most grade groups, it provides for measurement several grades below and above the particular group being tested.
7. It is organized and developed to be of immediate assistance to teachers. The mere tabulation of data provides a graphic evaluation and identifies specific difficulties.
8. It provides both grade placement and percentile norms.

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9. It provides two sets of directions for administration, one set when the tests are to be hand scored, and a different set when the tests are to be machine scored.

## II. NATURE OF THE TESTS

### Test 1—Reading Vocabulary

*Section A. Mathematics.* This test contains twenty-two words which the pupil identifies by matching words of opposite meaning. These words relate to mathematics and range from those appearing in the first thousand of the *Thorndike Word Book* to those which are less frequently used.

*Section B. Science.* The words included in this test are a part of the vocabulary of science and are designed to indicate the extent of a pupil's vocabulary in this field.

*Section C. Social Science.* This test contains twenty-three words which are matched with words of opposite meaning to indicate the wealth of social studies vocabulary.

*Section D. General.* The words included in this test are a sampling of words used in general literature and provide an additional sampling of the pupil's wealth of vocabulary.

Sections A, B, C, and D provide a total of 180 words which must be identified in order to secure the correct response and which, therefore, represents a valid test of basic vocabulary.

### Test 2—Reading Comprehension

*Section E. Following Directions.* Ten reading situations which require the following of specific directions and the reading of definitions and following directions are included in this test. Following specific directions is probably the simplest type of silent reading comprehension and is an essential ability necessary for the development of this skill.

*Section F. Reference Skills.* This section measures the extent to which the pupil is familiar with the vocabulary and skills needed for reference work and library research.

*Section G. Interpretation of Meaning.* The test situations included in this section provide for the measurement of the pupil's ability to comprehend directly stated facts, to select the best topics or central idea, to make inferences and deductions, and to understand an author's ideas as expressed in paragraphs.

Diagnostic aids for reading difficulty are presented on page 11.

### Test 3—Arithmetic Reasoning

*Section A. Number Concept.* This test includes items which indicate whether or not a pupil knows how to write numbers and money, and whether he has adequate number concepts in the fields of integers, fractions, and decimals.

*Section B. Symbols and Rules.* Fifteen items designed to indicate the pupil's understanding of some of the essential signs, symbols, and rules of mathematics are included.

*Section C. Numbers and Equations.* This test is designed to measure the extent to which the pupil comprehends and can solve simple problems requiring the use of negative numbers. The ability to solve equations is also included in this section.

*Section D. Problems.* Fifteen test items ranging from simple two-step problems through sharing and averaging, square and cubic measure, percentage, commissions and discount, and ratio are included.

### Test 4—Arithmetic Fundamentals

*Section E. Addition.* This test provides for an analysis of the essentials of addition of integers, fractions, and decimals. For the particular difficulties covered, see the Diagnostic Analysis on page 2 of the test booklet and page 9 of this Manual.

*Section F. Subtraction.* In a similar manner the most frequent sources of difficulty and the essentials of subtraction are included in this section. See the Diagnostic Analysis on page 2 of the test booklet.

*Section G. Multiplication.* The essential skills required in multiplication of integers, fractions, and decimals are tested in this section. See the Diagnostic Analysis on page 2 of the test booklet.

*Section H. Division.* The fundamental abilities required in division are tested in this section. See the Diagnostic Analysis on page 2 of the test booklet.

The examiner will note that, in all instances, the object has been to determine whether the pupil possesses the abilities required in the solution of problems. For diagnostic purposes, it is desirable to learn whether the pupil knows the mathematical principles involved in such steps as borrowing, cancellation, inverting divisors, and pointing off decimals.

It has been the object of the authors to provide simple situations which reveal the presence or absence of essential functional abilities rather than to include long and involved problems in the solution of which differences in attention span and memory may operate as disturbing factors.

Diagnostic aids for arithmetic difficulties are presented on page 11.

### Test 5—Language

*Section A. Capitalization.* This test is designed to measure the extent to which the pupil knows how to use capitals. It includes capitalization of the first word of a sentence, proper nouns, proper adjectives, proper abbreviations, and the first word of a quotation.

*Section B. Punctuation.* This test measures the pupil's knowledge of the use of commas, question marks, and quotation marks.

*Section C. Words and Sentences.* Ten sentences requiring language usage in the matter of number, case, and tense are included in this test. Also ten statements, some of which are complete sentences, are given to determine whether the pupil recognizes the elements of complete sentences.

**Section D. Parts of Speech.** This section provides twenty words which are to be classified as to parts of speech.

Diagnostic aids for language difficulties are presented on page 12.

**Section E. Spelling.** Thirty carefully selected words are used. Spelling is included in Language because of its use as a means of written expression.

Diagnostic aids for spelling difficulties are presented on page 12. Spelling norms are presented on page 5.

**Section F. Handwriting.** A standardized handwriting scale is provided in the Manual of Directions to enable the examiner to estimate the quality of the handwriting of each pupil as shown in his spelling test. The first few words of the spelling test have been selected for this purpose as the handwriting of pupils and the spelling situations are typical of their customary style of writing. These words are so easily spelled that there are practically no confusing factors involved in the situation. Diagnostic aids for handwriting difficulties are presented on page 12. Norms are presented on page 13.

### Conclusions

The tests in this battery are primarily diagnostic, on the conviction that the fundamental skills of reading, arithmetic, and language are essential to progress in other types of learning. The twenty-one sub-tests of the test battery will reveal pupils' strengths and weaknesses in many of these specific fundamentals.

The Diagnostic Analysis of Learning Difficulties will suggest to the teacher desirable remedial and constructive activities; thus the pupil will be enabled through teacher guidance to improve his ability to learn and progress. Giving due consideration to the curricular objectives for her particular group, the teacher should be sure that each pupil masters these tools of further learning to the limit of his capacity.

### III. DIRECTIONS FOR GIVING HAND SCORED EDITION<sup>1</sup>

The tests in this battery are primarily diagnostic even though they reveal the grade placement and percentile rank of pupils as well. The intention is to secure as accurate an indication as possible of each pupil's abilities and difficulties in the skills tested, with an emphasis on comprehension and ability rather than on speed.

The following time allotments are given to assist administrators desiring a definite schedule:

Test 1.....	12 minutes
Test 2.....	38 minutes
Test 3.....	30 minutes
Test 4.....	44 minutes
Test 5.....	26 minutes
TOTAL TIME.....	150 minutes (2 hrs. 30 min.)

Careful study of tryouts indicates that most pupils can respond to the test situations and indicate their skill mastery within these time limits; hence the test remains a power rather than speed test, and the "no time limit" norms remain valid. In many instances, classes of advanced or bright pupils will have completed a test section in less than the specified time.

<sup>1</sup>A special set of directions is furnished for giving these tests when they are to be machine scored.

In such instances the examiner should proceed with the next succeeding test without waiting for the specified time to elapse. Time should not, of course, be counted until pupils begin the actual test in each case.

It is desirable that pupils shall understand clearly the manner in which they are expected to indicate their responses. However, the examiner should remember that a testing rather than a teaching situation is desired and that *the correct response should in no way be indicated* except in practice exercises. Pupils should have soft lead pencils.

Directions to be given pupils are in black type.

The test should be given with rest intervals between the three subjects: reading, arithmetic, and language.

After identifying data are recorded on the front page state: **Open up your booklet and fold back the page like this.** (Demonstrate and be sure that pupils have the same test.)

### READING

TEST I, SEC. A. (*Suggested time limit, 3 minutes.*)

Read the directions. Underline the word which means the opposite or about the opposite of the first word. Write its number on the line to the right.

See the first word, large? Look at the four words on the same line. Which is the opposite? Yes, small. Notice that small is underlined and that its number 2 is written on the line to the right. (Illustrate if necessary.) Be sure pupils understand the directions.

Now do all the others that you can from 1 to 22. Be sure to write the number on the line to the right. Ready, begin. (Circulate among the pupils to make sure they are following directions and putting the answers on the line to the right.)

When 90% of the class have finished, say: Now look at the column to the right.

TEST 1, SEC. B. (*Suggested time limit, 3 minutes.*)

Do these in the same manner. Do as many of these as you can from 1 to 23.

When 90% of the class have finished, say: Now turn to the next page.

TEST 1, SEC. C. (*Suggested time limit, 3 minutes.*)

Do the first column in the same manner.

When 90% of the class have finished, say: Now, look at the column to the right.

TEST 1, SEC. D. (*Suggested time limit, 3 minutes.*)

Do these in the same manner.

When 90% of the class have finished, say: Now turn to the next page.

TEST 2, SEC. E. (*Suggested time limit, 8 minutes.*)

Read the directions and do exactly as they say from 1 to 10.

When 90% of the class have finished, say: Now turn to the next page.

TEST 2, SEC. F. (*Suggested time limit, 5 minutes.*)

Read the instructions and answer the questions. When 90% of the class have finished, say: Now turn to the next page.

**TEST 2, SEC. G.** (*Suggested time limit, 25 minutes.*)

Read the stories and answer the questions. When you have finished each page go right on to the next page. Stop at the bottom of page 9.

When 90% of the class have finished, or if pupils cannot complete the exercises, a rest period of at least a few minutes should be taken. It is preferable to complete the test after a recess has intervened.

After recess, say: Turn to the next page, which has number exercises.

## ARITHMETIC

**TEST 3, SEC. A, B, AND C.** (*Suggested time limit for Sec. A, 4 minutes; for Sec. B, 5 minutes; and for Sec. C, 5 minutes.*)

On this page you are to write in the numbers or do just what it says. Do the first column and then the second column. Ready, begin. (Circulate among the pupils to assure yourself that the directions are understood. Do not help them with the answers. Encourage the pupils if necessary.)

When 90% of the class have finished, or if pupils cannot complete the exercise, say: Now turn to the next page.

**TEST 3, SEC. D.** (*Suggested time limit, 16 minutes.*)

Read the problems and do as many as you can.

When 90% of the class have finished, or if the pupils cannot complete the exercise, say: Now turn to the next page.

**TEST 4, SEC. E AND F.** (*Suggested time limit for each Section, 10 minutes.*)

Do these problems in addition and subtraction as quickly as you can without making mistakes. Write your answer below each problem and also on the line to the right. (Circulate among the pupils to see if they are doing the problems and putting the answers on the line to the right.)

When 90% of the class have finished, or if pupils cannot complete the exercise, say: Now turn to the next page.

**TEST 4, SEC. G AND H.** (*Suggested time limit for each Section, 12 minutes.*)

These are problems in multiplication and division. Do as many as you can. Write your answer below each problem and also on the line to the right.

When 90% of the class have finished, or if the pupils cannot complete the exercises, say: Turn to the next page.

A recess should ordinarily be taken at this time or the test may be completed after any pupils who need to sharpen their pencils have been given opportunity to do so.

## LANGUAGE

**TEST 5, SEC. A.** (*Suggested time limit, 3 minutes.*)

Read the directions. In these sentences draw a line under each letter that should be a capital letter and write the letters that should be capitals on the line to the right. Ready, begin.

When 90% of the class have finished, say: Now look at the bottom of the column.

**TEST 5, SEC. B.** (*Suggested time limit, 2 minutes.*)

Now write in the commas, question marks, and quotation marks that are left out of this story.

When 90% of the class have finished, say: Look at the right side of the page.

**TEST 5, SEC. C.** (*Suggested time limit, 4 minutes.*)

Read the directions. Draw a line under the word which will make a good sentence. Write its number on the line to the right. When you come to the middle of the page the directions change. If the statements given are complete sentences draw a line under the word, YES; if not, draw a line under the word, NO. Ready, begin.

When 90% of the class have finished, or if pupils cannot complete the exercise, say: Turn to the next page.

**TEST 5, SEC. D.** (*Suggested time limit, 5 minutes.*)

**Form A:**

Read the sentence: We walk in the park almost every afternoon and watch other small children feed doves which perch on their shoulders.

**Form B:**

Read the sentence: We walk by the river nearly every day and watch other older children sail boats which glide over the water.

**Form C:**

Read the sentence: They wandered in the forest nearly every day and watched other little children pick flowers which grew among the trees.

Classify each of these words by parts of speech by writing them in the columns below.

**TEST 5, SEC. E.** (*Suggested time limit, 12 minutes.*)

I shall give you some spelling words. I shall pronounce the word, use it in a sentence, and then pronounce it again. Then you will write only the word on the line.

For spelling tests, see pages 5 and 6. (Be sure to use appropriate list.)

First word. (Read the word, sentence, and word, then pause.) Second word, etc. (Do not repeat words or sentences.)

## IV. DIRECTIONS FOR HAND SCORING

The examiner may use the key or mark an unused test booklet with the correct answers as an aid in scoring. It is advisable for the examiner to take the test without reference to the key since this procedure will acquaint her with the diagnostic values of the test items.

**General Instructions:**

1. In scoring tests, each item is considered right or wrong. No partial credits are given for partial answers.
2. Mark each correct item with a C.
3. The score for each section is the number right.
4. Credit any clear method of indicating the correct answer. Consider the intention of the pupil, if it can be determined. If in doubt, consider the answer wrong.

5. If two or more answers are given count the item wrong, unless the pupil has attempted to erase or cross out the incorrect answer.

6. Credit correct underlined answers even though the answer is not written on the line to the right, except in Test 2, Sec. E.

7. In using the handwriting scale:

a. Compare the quality and legibility of pupil's writing of first five spelling words with the samples.

b. Ignore misspelling in scoring handwriting.

c. If it appears that the pupil's writing is inferior or superior to samples given, intermediate scores of 3, 5, 7, 9, 11, 13, and 15 may be assigned.

## SPELLING TEST

### FORM A

1. grocery	I will go to the GROCERY store.	grocery
2. doubt	They DOUBT his story.	doubt
3. concert	Did you like the music at the CONCERT?	concert
4. assist	Will you ASSIST the teacher?	assist
5. listened	They LISTENED to the instructions.	listened
6. often	We go to the park OFTEN.	often
7. society	He joined a literary SOCIETY.	society
8. whistle	The policeman blew his WHISTLE.	whistle
9. motion	The MOTION of the trees is beautiful.	motion
10. elephant	An ELEPHANT is a very large animal.	elephant
11. century	A CENTURY is a hundred years.	century
12. supply	Our SUPPLY of food is low.	supply
13. investigate	The police will INVESTIGATE.	investigate
14. examination	She passed the EXAMINATION.	examination
15. improvement	A great IMPROVEMENT has been made.	improvement
16. career	She has chosen a CAREER.	career
17. mysterious	The visitor was a MYSTERIOUS person.	mysterious
18. association	He joined the ASSOCIATION.	association
19. column	Add the COLUMN of figures.	column
20. cereal	Mary ate CEREAL every morning.	cereal
21. individual	Each person had an INDIVIDUAL cup.	individual
22. scissors	We cut cloth with SCISSORS.	scissors
23. yacht	The YACHT sailed smoothly over the ocean.	yacht
24. session	Congress was in SESSION a few months.	session
25. evidence	New EVIDENCE was presented by the lawyer.	evidence
26. prairie	The PRAIRIE grass is dry.	prairie
27. mosquito	A MOSQUITO bit him.	mosquito
28. apparent	It was APPARENT that he had not studied.	apparent
29. campaign	The CAMPAIGN was well managed.	campaign
30. magnificent	It is a MAGNIFICENT spectacle.	magnificent

### INTERMEDIATE SPELLING TEST NORMS

Grade Placement	No. Right	Grade Placement	No. Right	Grade Placement	No. Right	Grade Placement	No. Right	Grade Placement	No. Right
3.5	1	5.5	7	6.8	13	8.0	19	9.2	25
4.0	2	5.8	8	7.0	14	8.2	20	9.6	26
4.5	3	6.0	9	7.2	15	8.4	21	10.0	27
4.8	4	6.2	10	7.4	16	8.6	22	10.5	28
5.0	5	6.4	11	7.6	17	8.8	23	11.0	29
5.3	6	6.6	12	7.8	18	9.0	24	11.5+	30



## SPELLING TEST

### FORM B

1. motion
2. mention
3. arrive
4. believe
5. piece
6. too
7. license
8. leisure
9. valise
10. relieve
11. neither
12. marriage
13. investigate
14. behavior
15. comrade
16. dictionary
17. elephant
18. frightened
19. telephone
20. purchased
21. discussion
22. innocent
23. sacrifice
24. volunteer
25. experience
26. arrangement
27. testimony
28. individual
29. reference
30. evidence

He made a **MOTION** to adjourn.  
 Do not **MENTION** this to anyone.  
 We will **ARRIVE** at ten o'clock.  
 We **BELIEVE** the story.  
 The **PIECE** of pie was eaten by Bill.  
 There are **TOO** many chairs in the room.  
 The **LICENSE** was issued in January.  
 Too much **LEISURE** is not good.  
 The **VALISE** was heavy.  
 They will **RELIEVE** the firemen.  
**NEITHER** child knew the answer.  
 The **MARRIAGE** took place at noon.  
 We must **INVESTIGATE** at once.  
 His **BEHAVIOR** was troublesome.  
 Jack was his **COMRADE** in the war.  
 Look up the word in the **DICTIONARY**.  
 An **ELEPHANT** is a large animal.  
 She was **FRIGHTENED** by the dog.  
**TELEPHONE** me at two o'clock.  
 We **PURCHASED** an automobile.  
 The **DISCUSSION** lasted a long time.  
 He was **INNOCENT** of the crime.  
 The **SACRIFICE** was great.  
 Who will **VOLUNTEER**?  
 The **EXPERIENCE** was unusual.  
 The **ARRANGEMENT** was satisfactory.  
 The **TESTIMONY** was false.  
 That **INDIVIDUAL** is to blame.  
 Name one person as **REFERENCE**.  
 There was little **EVIDENCE**.

motion  
 mention  
 arrive  
 believe  
 piece  
 too  
 license  
 leisure  
 valise  
 relieve  
 neither  
 marriage  
 investigate  
 behavior  
 comrade  
 dictionary  
 elephant  
 frightened  
 telephone  
 purchased  
 discussion  
 innocent  
 sacrifice  
 volunteer  
 experience  
 arrangement  
 testimony  
 individual  
 reference  
 evidence

### FORM C

1. grocery
2. doubt
3. concert
4. design
5. stopped
6. prepare
7. speech
8. recess
9. celery
10. automobile
11. niece
12. fertile
13. witness
14. carriage
15. condition
16. occasion
17. solemn
18. colonies
19. welfare
20. hominy
21. desirable
22. citizen
23. responsible
24. extremely
25. tying
26. independent
27. unusual
28. athletic
29. vicinity
30. elaborate

He went to the **GROCERY** store.  
 They **DOUBT** his story.  
 They listened to the band **CONCERT**.  
 Will you help **DESIGN** my dress?  
 They **STOPPED** at the curb.  
 She will **PREPARE** our lunch.  
 We heard the governor's **SPEECH**.  
 We play ball at **RECESS**.  
**CELERY** is good to eat.  
 We have a new **AUTOMOBILE**.  
 Joan is my favorite **NIECE**.  
 This ground is very **FERTILE**.  
 He is our most important **WITNESS**.  
 Our **CARRIAGE** is waiting.  
 He is in a serious **CONDITION**.  
 This is an important **OCCASION**.  
 Everyone was very **SOLEMN**.  
 There were thirteen **COLONIES**.  
 The **WELFARE** of all must be considered.  
 Jack likes **HOMINY** for lunch.  
 She has many **DESIRABLE** qualities.  
 He is a **CITIZEN** of this country.  
 I am **RESPONSIBLE** for her care.  
 They are **EXTREMELY** careful.  
 The **TYING** run came in the eighth inning.  
 He is a very **INDEPENDENT** person.  
 This is a most **UNUSUAL** case.  
 He likes **ATHLETIC** sports.  
 They live somewhere in this **VICINITY**.  
 Her gown was **ELABORATE**.

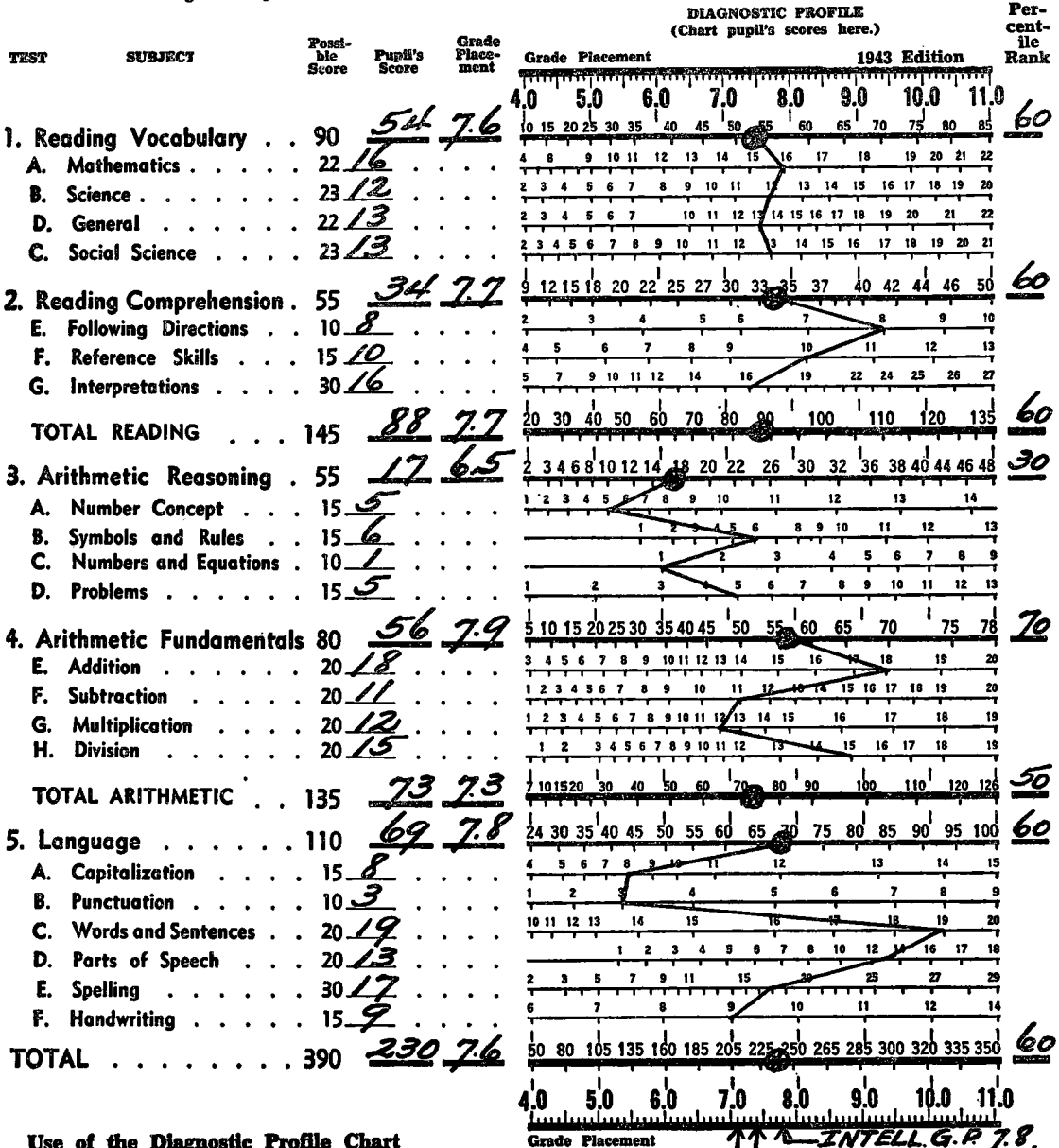
grocery  
 doubt  
 concert  
 design  
 stopped  
 prepare  
 speech  
 recess  
 celery  
 automobile  
 niece  
 fertile  
 witness  
 carriage  
 condition  
 occasion  
 solemn  
 colonies  
 welfare  
 hominy  
 desirable  
 citizen  
 responsible  
 extremely  
 tying  
 independent  
 unusual  
 athletic  
 vicinity  
 elaborate

FORMS A and C		Score	FORM B	
grocery	doubt	4	motion	arrive
concert			believe	
grocery	doubt	6	motion	arrive
concert			believe	
grocery	doubt	8	motion	arrive
concert			believe	
grocery	doubt	10	motion	arrive
concert			believe	
grocery	doubt	12	motion	arrive
concert			believe	
grocery	doubt	14	motion	arrive
concert			believe	
		Score		

## V. DIRECTIONS FOR USING TEST RESULTS

**A. The Diagnostic Profile.** The first step in the teacher's use of the results of the test is the completion of the Diagnostic Profile illustrated on this page. Directions are given below.

**A Test Given in January to a L7 Pupil. Age 153 Months. Mental Age, 160 Months.**



### Use of the Diagnostic Profile Chart

The steps necessary for interpretation of pupil responses are as follows:

1. Transfer the scores for each section of the test battery to the first page of the test booklet. In the illustration the pupil's scores on Test 1, Sec. A, B, C, and D were 16, 12, 13, and 13.

2. Total the sub-sections to give the score for each of the five tests. In the illustration, the pupil's score on Test 1 is 54.

3. Add the scores for the five tests to determine the total score. In the illustration, the total score is 230.

4. Record the grade placement values of the scores on each of the five tests and the total scores. In the illustration, these are 7.6, 7.7, 7.7, 6.5, 7.9, 7.3, 7.8, and 7.6. They are read directly from the Diagnostic Profile chart or from the Manual.

5. To prepare the Diagnostic Profile, mark the points as illustrated on each horizontal line which correspond to the pupil's scores or grade placements written to the left, and connect them.

6. To determine the adequacy of skill mastery, compare the lines of the profile with the actual grade placement. In the illustration, the pupil has been in the seventh grade four months, hence he has a grade placement of 7.4. Imagine or draw a line connecting the 7.4 points of the heavy grade placement scales at the top and bottom of the illustration. When the profile lines extend significantly to the left of this vertical line, the use of the diagnostic analysis blank is indicated. For practical purposes in interpretation each .1 of a grade placement may be considered the equivalent of one school month.

7. Chronological and intelligence grade placements may be read directly from the norms of this Manual (by locating the given chronological and mental ages) and indicated at the bottom of the profile for comparison, as in the illustration.

(Continued on page 10)

## B. The Diagnostic Analysis of Learning Difficulties

If the diagnostic profile of a test indicates that a pupil is making normal progress in all fields the teacher will have no use for the following diagnostic analysis. However, where the diagnostic profile shows achievement below a desirable standard in one or more major fields, the following device, which appears somewhere on every copy of these achievement tests, will assist in identifying and analyzing the specific causes of difficulty as a basis for remedial instruction.

The numerals and capital letters in the diagnostic analysis correspond to the sections of the test similarly marked. For example, if the diagnostic profile shows unsatisfactory achievement in Test 4, Sec. E (addition in arithmetic fundamentals), an inspection of the unsatisfactory responses in this section of the test (by number) will reveal whether or not remedial instruction is needed in carrying, use of zeros, reducing to common denominators, and the like. These topics are then checked by the teacher as the basis for remedial work.

Once an adequate diagnosis has been made, remedial instruction is frequently a simple matter. However, teachers have in the past found the clerical work incident to following each individual pupil a heavy burden. Such extra work is almost completely eliminated if this diagnostic analysis is torn from the test booklet and kept on the teacher's desk where the various items may be checked off as the pupil masters them.

## READING

### 1. Reading Vocabulary

#### A. MATHEMATICS:

— Basic vocabulary .....1-22

#### B. SCIENCE:

— Basic vocabulary .....1-23

#### C. SOCIAL SCIENCE:

— Basic vocabulary .....1-23

#### D. GENERAL:

— Basic vocabulary .....1-22

### 2. Reading Comprehension

#### E. FOLLOWING SPECIFIC

##### DIRECTIONS:

— Directions requiring

simple choice .....1-2

— Reading definitions and

following directions .....3-10

#### F. REFERENCE SKILLS:

— Parts of book .....1-5

— Use of table of

contents .....6-7

— Use of index .....8-10

— Selecting references .....11-15

### G. INTERPRETATION OF MEANINGS:

— Selecting topic or central idea .....1, 8, 15

— Understanding directly stated facts .....2, 3, 4, 7, 9, 12, 13, 14, 16, 17, 18, 20

— Making inferences.....5, 6, 10, 11, 19, 21, 22

— Comprehension of author's organization of topics .....23-26

— Sequence of events .....27-30

## ARITHMETIC

### 3. Arithmetic Reasoning

#### A. NUMBER CONCEPT:

— Writing numbers .....1-5

— Writing money .....6

— Writing per cent .....7

— Roman numbers .....8-10

— Concept of whole numbers .....11

— Concept of fractions and decimals .....12-14

— Concept of negative numbers .....15

#### B. SYMBOLS AND RULES:

— Symbols .....1, 2, 6-10

— Vocabulary .....3-5

— Rules .....11-15

#### C. NUMBERS AND EQUATIONS:

— Negative numbers .....1, 3-5

— Solving equations .....6-10

#### D. PROBLEMS:

— Two-step Problems .....1-3

— Sharing and averaging .....1-3

— Square and cubic measure .....4-7

— Commission and discount .....13-15

— Percentage .....9-12

— Ratio .....8

### 4. Arithmetic Fundamentals

#### E. ADDITION:

— Simple combinations .....1-2

— Carrying .....3-6

— Zeros .....2, 5, 8

— Column addition .....4-6

— Adding money .....6, 8

— Denominate numbers .....6-8

— Adding fractions .....9-15

— Reducing fractions to common denom. ....10, 12-15

— Adding mixed numbers .....11-15

— Adding fractions and decimals .....16-17

— Writing decimals in column .....18-19

— Adding percentages .....20

#### F. SUBTRACTION:

— Simple combinations .....1-2

— Borrowing .....3-7

— Zeros .....2, 4, 5, 7

— Subtracting money .....6-7

— Denominate numbers .....6-8

— Subtracting numerators .....9-10

— Reducing fractions to common denominators ....11-12

— Borrowing with mixed numbers .....14-15

— Subtracting fractions from decimals .....16-17

— Writing decimals in column .....18-19

— Fractional parts .....20

### G. MULTIPLICATION:

— Tables .....1-7

— Zeros in multiplicand .....3, 6, 7

— Zeros in multiplier .....5, 6, 7

— Two-place multipliers .....4-7

— Denominate numbers .....8

— Cancellation of fractions .....9, 11-15

— Mult. num. and denom. ....10

— Fractions and mixed numbers .....13-16

— Fractions and decimals .....17

— Pointing off decimals ....18, 19

— Per cent of number .....20

### H. DIVISION:

— Tables .....1-7

— Zeros in quotient .....2, 6

— Remainders .....7

— Inverting divisor in fractions .....8-15

— Mixed numbers .....13-15

— Reducing fractions to decimals .....16

— Pointing off decimals .....17-19

— Fractional parts .....20

## LANGUAGE

### 5. Language

#### A. CAPITALIZATION:

— First word of sentence .....1-2

— Names of persons .....4, 8

— Names of places .....4, 7

— Days of week and months .....3, 6, 8

— Abbreviations for months .....3

— Title of book .....5

— First word of quotation .....9

— Over-capitalization .....

#### B. PUNCTUATION:

— Periods .....

— Commas .....

— Question marks .....

— Quotation marks .....

— Quotation within quotation ....

— Over-punctuation .....

#### C. WORDS AND SENTENCES:

— Singulars and plurals .....1-2

— Case .....6-8

— Tense .....3-5

— Good usage .....9-10

— Recognizing sentences ....11-20

#### D. PARTS OF SPEECH:

— Nouns .....Adverbs

— Pronouns .....Conjunctions

— Verbs .....Prepositions

— Adjectives .....

#### E. SPELLING:

.....

.....

.....

.....

#### F. HANDWRITING:

— Legibility .....

A. Age and mental age are changed to Grade Placements by use of the last two columns of the table of norms in the Manual. For example, a pupil 12 years, 9 months, or 153 months, of age has a chronological grade placement of 7.1. A pupil with a mental age of 160 months has an intelligence grade placement of 7.8.

B. Actual grade assignment is determined by adding pupil's grade to the following decimal fractions of the school year:

	B (Low)	A (High)
September or February.....	.0	.5
October or March.....	.1	.6
November or April.....	.2	.7
December or May.....	.3	.8
January or June.....	.4	.9

In the illustration, the pupil was a L7 in January or 7.4.

### C. Analysis and Treatment of Group Difficulties

1. It is sometimes desirable to determine what per cent of a class (or larger group) is deficient in each of the 100 essential functional elements represented in the Diagnostic Analysis. To obtain this information the examiner simply combines the results of all individual diagnostic analyses and writes the appropriate per cent for each item. The highest per cents identify the areas of greatest difficulty.

2. The Summaries of Class Data. This record presents two summaries of class status in terms of the five major divisions of the battery (reading vocabulary, reading comprehension, arithmetic reasoning, arithmetic fundamentals, and language). The first summary reveals the number of pupils who have attained each grade placement in the five areas; the second summary reveals the number of pupils who have attained each percentile rank in each of these five areas.

3. On the basis of the above types of information, pupils may be:

- Grouped in reading, arithmetic, or language usage for educational activities and guidance.
- Assigned activities and projects which meet their actual needs.
- Given revised time schedules for working at activities which meet their needs.

The percentile and grade placement summaries also reveal the probable extent to which pupils are mastering the tools of learning (developing fundamental skills) in informal programs; for example, the extent to which pupils are actually learning to read in informal schools where sufficient reading ability is generally assumed, but where, in some instances, neither the reading ability of pupils nor the difficulty of reading materials are determined.

### D. Use of Test Results by Supervisors, Principals, and Superintendents

1. The Summary of Class Data. Administrators and supervisors will find that the Summary of Class Data (furnished with each package of tests) provides a convenient and accurate picture of the status of every class, which is valuable as a guide for supervisory and administrative assistance to teachers.

2. Master Class Summary. By combining the percentile and/or grade placement data of the class summaries for each grade, administrators and supervisors will have a picture of the status of each grade in each of the five major skill areas. Such master summaries identify the points of need for administrative and/or supervisory assistance.

Where principals and superintendents possess class and school medians (or averages) for these tests they may use this information for such purposes as the following:

- To refute ill-founded charges that school achievement is below reasonable expectations when test results show achievement to be satisfactory.
- To determine whether differences in achievement between succeeding grades is satisfactory.
- To determine whether achievement of the objectives of the curriculum is improving, static, or regressing in various fields and areas.
- To determine whether marking practices in various schools reflect the facts as revealed by test results.
- To develop policies related to ability grouping of pupils for instructional purposes.
- To determine whether per cents of pupil "failure" (where pupils are failed) in various schools reflect the facts as revealed by test results.
- To determine whether achievement test results are reasonable and satisfactory in the light of the intelligence of school pupils as indicated in the table on page 11.

3. Standardized Achievement Test Data In Relation To I. Q. Medians. The tabulation on page 11 presents the variety of median accomplishments of schools as shown by educational and mental test surveys. The data are based on over 100 school surveys. They are presented to show the range of median intelligence quotients, median intelligence grade placements (mental ages in terms of school grades), and median achievement in the essential skills as found in various schools.

The data are given in percentiles and show the fractions of a school year above (+) or below (—) test norms for the subjects reported. Individual pupils within single classes or grades will, of course, ordinarily differ more widely in capacity and accomplishment than do class averages under the most varied circumstances. These data, however, should indicate the need for differentiated standards in directing the educational program and in evaluating the accomplishment of schools and classroom groups. In fact, these data may be used to provide standards of accomplishment for classes of varying I.Q.'s. Thus a class with an average I.Q. of 110 should be expected to have an accomplishment three-quarters of a year above norm; a class with an average I.Q. of 85 is making reasonably satisfactory progress if the average ac-

## Class and School Medians

Per- centile Rank	Intelligence Quotient	Intelligence Grade Placement	Reading Vocabulary	Reading Comprehension	Arithmetic Reasoning	Arithmetic Fundamentals	Language	Total
99	114	+ .94	+ .94	+ .90	+ .93	+1.08	+ .93	+ .96
95	110	+ .74	+ .72	+ .81	+ .60	+ .85	+ .76	+ .75
90	108	+ .61	+ .46	+ .62	+ .42	+ .70	+ .56	+ .55
80	105	+ .37	+ .30	+ .38	+ .29	+ .43	+ .35	+ .35
70	103	+ .26	+ .20	+ .18	+ .18	+ .27	+ .21	+ .21
60	101	+ .13	+ .10	+ .08	+ .09	+ .13	+ .10	+ .10
50	100	.00	.00	.00	.00	.00	.00	.00
40	98	— .10	— .09	— .16	— .17	— .07	— .12	— .16
30	96	— .18	— .16	— .29	— .34	— .20	— .21	— .24
20	94	— .27	— .33	— .40	— .59	— .39	— .34	— .33
10	89	— .50	— .53	— .60	— .87	— .57	— .54	— .62
5	85	— .60	— .62	— .79	—1.02	— .70	.67	— .76
1	75	— .88	—1.38	—1.83	—2.52	— .79	—1.36	—1.55

complishment is two-thirds of a year below norm.

4. Master Diagnostic Analysis. Where each school in a school system uses the Diagnostic Analysis (presented and illustrated on page 9) to tabulate in one report the errors made by all pupils taking each test, such tabulations may be combined to make a Diagnostic Analysis for each grade or for the school system as a whole. Such information serves as the basis for more efficient supervision and administration.

- a. Supervisors and directors may plan their schedules so as to aid schools and grades which really need assistance.
- b. Principals and supervisors may help teachers who need assistance.
- c. Curriculum departments may revise curricula on the basis of actual needs.
- d. City, county, or community-wide error tabulations frequently reveal the desirability of changes in textbooks, materials, or teaching procedures.
- e. Assignment officers can place teachers where they can work to best advantage.

### E. Diagnosis in Specific Areas

Some misunderstanding has persisted regarding the relation of testing and teaching. Testing, some still allege, is atomistic, fragmentary, and more or less antagonistic to the normal psychological approach used in teaching; testing is charged with being mechanistic while teaching is said to be functional. In addition, teaching is said to recognize the wholeness or unity of the learner.

However, this viewpoint is erroneous. Both teaching and testing may be either mechanistic or functional. Just as the identification and treatment of a specific sprained ankle, of high blood pressure, or of defective vision adds to the functional well-being of the organism, so the identification and treatment of specific learning difficulties may contribute to the functional nature and effectiveness of learning.

Further suggestions for specific diagnosis in the areas covered by these achievement tests follow.

**Diagnosis in Reading.** Among the basic factors responsible for difficulties in reading are the following:

1. Inadequate mental maturity
2. Physiological immaturity
3. Visual defects
4. Auditory defects
5. Social and environmental inadequacies

Evidences of mental or physiological immaturity indicate a need for reclassification; visual and auditory defects may be eliminated or relieved. Such factors lead to difficulties in distinguishing between gross and slight differences in word forms, initial or ending sounds, type faces, and the like as identified in the first exercises of this test.

Other difficulties may be:

1. Inability to recognize words; too limited a vocabulary
2. Lack of skill in adding new words to writing or speaking vocabulary
3. Inability to comprehend or follow directions
4. Inability to generalize; to relate specific facts to central theme or idea; to make inferences
5. Lack of skill in locating necessary information by knowing parts of books, locating topic sentences, etc.

Reading is a complex process, but for practical purposes tests must be limited in length. Thus teachers are aided in identifying only the most important causes of difficulty. However, once identified, the pupil's needs are known, and the teacher's task is clarified.

**Diagnosis in Arithmetic.** The number of combinations and processes to be mastered in arithmetic during any given period is limited. Although lack of adequate mental maturity is sometimes a factor, usually the most significant obstacle to progress is failure on the part of the teacher to identify the unmastered elements, and to assist pupils in making lists of their specific needs as a guide to intelligent study. When both teachers and pupils know exactly what is to be done, all of the varied resources of

methods and procedures may be focused on these pupil needs. (See the Analysis of Learning Difficulties in or on the test booklet.)

In diagnosing difficulties in arithmetic reasoning, the teacher must first determine whether or not apparent difficulties in reasoning are due to unmastered combinations and processes. If so, the immediate task has been identified.

However, if the obstacle is inability to "think through" the problem at hand the teacher may use a generalized approach which is valuable in other areas, as well as in arithmetic. The pupil should be taught to identify the conditions of his problem by some such approach as the following:

1. Read the problem carefully.
2. What kind of an answer does the problem require?
3. In what units or form must the answer be given?
4. What pertinent or related facts are given in the problem?
5. Are other facts not stated in the problem needed to solve it?
6. Before attempting to solve the problem, estimate about what the answer should be?

If the pupil is still unable to reach a solution, the teacher will frequently find it advisable to have him "talk through" the problem, telling what he does and why, at each step. This will usually identify the difficulty and provide the data for meeting the pupil's specific needs.

**Diagnosis in Language.** Language usage is primarily a matter of habit. The persistence of language errors is not due so much to lack of pupil ability as to lack of adequate teacher guidance. Among the procedures which will aid the teacher in diagnosis, as well as in continuing guidance are:

1. Help each pupil to keep an up-to-date list of his own errors. This list should be made up from his tests, regular written work, and oral language activities.
2. Keep a duplicate up-to-date teacher list for each pupil or have pupil keep his list available for inspection when the teacher helps him.
3. Summarize the specific errors for the class so that the major class problems may be identified.
4. Have pupils check their own and other pupils' written work as well as oral language, to focus attention on desirable usage.
5. Plan definite activities requiring usage related to specific errors.

The above class and individual lists constitute major objectives of language usage activities. Although the effort to secure correct usage should not overshadow the major objective of meaningful communication, correct usage will not be achieved if the story, dramatization, or written work proceeds entirely without attention, to form. It is not a question of either-or, but of both objectives being served. Both pupils and teachers should be conscious of these specific goals while submerging them some-

what in the activities under way. It is a problem of balance; most language errors persist because an over-emphasis on communication prevents continuous, systematic attention to the specific individual needs of each pupil. Reading and hearing good English are both aids to the achievement of good usage; but so far they have failed, when utilized exclusively, to eliminate many language errors.

**Diagnosis in Spelling.** Among the major causes of spelling disability are:

1. Defective vision, hearing, or both
2. Poor visual, auditory, or muscular memory, or combinations of them
3. Writing too slowly to keep up while test is being given
4. Immaturity, intellectual and physical, or both
5. Poor health
6. Carelessness or lack of persistence in studying words
7. Lack of knowledge of how to learn to spell words
8. Failure to keep personal lists of unlearned words for additional study
9. Lack of assistance and guidance concerning individual needs.

Teachers should identify causes of disability before attempting remedial activities.

Spelling ability is not inherited. While it is dependent upon inherited structures, most lack of success is due to remedial causes. Growth in spelling ability depends upon an integration of attitude, effort, and skill which includes an appreciation of the desirability of learning to spell, as well as insight into the methods of mastering spelling.

**Diagnosis in Handwriting.** Among the major causes of poor handwriting are:

1. Defective vision
2. Mental immaturity
3. Poor motor coordination
5. Lack of intelligent practice
6. Incorrect diagnosis and inadequate guidance in remedial activities.

Improvement in handwriting, besides being a function of such factors as adequate appreciation and motivation, is dependent upon improving certain inadequate specific motor habits, among them the following:

1. Poor pen position, resulting in too light or too heavy strokes and other undesirable effects
2. Wrong or poor letter (hence word) forms
3. Poor letter size, spacing, or both
4. Poor beginning and ending strokes
6. Poor alignment.

After the causes of poor handwriting have been eliminated or compensated for, as far as possible, the teacher should aid the pupil to identify his specific weaknesses, increase motivation, develop in-

## PERCENTILE NORMS—INTERMEDIATE BATTERY

### IX. THE USE AND INTERPRETATION OF PERCENTILE NORMS

Grade or age norms make possible the interpretation of a pupil's score by relating it to the average (median) achievement of a large group of pupils. Thus, a pupil receiving a 4.5 grade placement in any subject has done as well as the average of pupils half-way through the fourth grade. However, if the pupil should be in the low third grade, the teacher or counselor may be more interested in knowing just how competent the pupil is in comparison with typical pupils of the same grade.

Percentile norms provide for the comparison of pupils in relation to others of their own grade group. Thus, a low third grade pupil tested in mid-term ("C" norms) and receiving a Reading Vocabulary grade placement of 4.5 would have a percentile rank of 90. This means that he exceeds 90 per cent but is inferior to 10 per cent of low third grade pupils. If a pupil in the same grade had received a reading vocabulary grade placement of 2.4, he would have a percentile rank of 15. This means that he exceeds 15 per cent but is inferior to 85 per cent of low third grade pupils.

It is a more appropriate interpretation of test data to think of low third grade pupils who have obtained grade placements of 2.4 or 4.5, as pupils having a 15 or a 90 percentile rank for the low

third grade, rather than that they are low second or high fourth grade pupils in the third grade.

The Percentile Norms provided in this Manual are based on data from over 25,000 of these achievement tests given in many states throughout the United States. It will be noted that the presentation of grade placements for each half grade in relationship to the various percentiles provides an easy and meaningful plan for using these norms.

It will be seen that there are three sets of percentiles for each half grade, except grade Low 1, as follows:

- A. For use when tests are given during the first month of the term; i.e., when pupils have an actual grade placement of  $-.0$  or  $-.5$ .
- B. For use when tests are given during the last month of the term; i.e., when pupils have an actual grade placement of  $-.4$  or  $-.9$ .
- C. For use when tests are given during the three middle months of the terms; i.e., when pupils have an actual grade placement of  $-.1$ ,  $.2$ , or  $.3$ , or  $-.6$ ,  $.7$ , or  $.8$ . (See pages 8-10, item 7B.)

### RELATION OF PERCENTILE NORMS TO STANDARD SCORES OR T-SCORES

The following table presents the relationship between percentile rank and T-scores:

PERCENTILE RANK:	1	5	10	15	20	25	30	40	50	60	70	75	80	85	90	95	99
STANDARD OR T-SCORE:	27	34	37	40	42	43	45	47	50	53	55	57	58	60	63	66	73



# PERCENTILE NORMS FOR GRADE LOW 7 (7.0-7.4)

A	1	5	10	15	20	25	40	50	60	70	75	75	80	85	90	95	99
B & C	1	5	10	15	20	25	30	40	50	60	70	75	80	85	90	95	99
READING																	
VOCABULARY.....	4.0	4.1-4.9	5.0-5.4	5.5-5.9	6.0-6.2	6.3-6.4	6.5-6.7	6.8-7.0	7.1-7.4	7.5-7.8	7.9-8.0	8.1-8.2	8.3-8.4	8.5-8.8	8.9-9.3	9.4-10.2	10.3+
READING																	
COMPREHENSION.....	4.5	4.6-5.1	5.2-5.5	5.6-5.9	6.0-6.2	6.3-6.4	6.5-6.7	6.8-7.0	7.1-7.4	7.5-7.8	7.9-8.0	8.1-8.2	8.3-8.5	8.6-8.8	8.9-9.3	9.4-10.1	10.2+
TOTAL																	
READING.....	4.2	4.3-5.0	5.1-5.4	5.5-5.9	6.0-6.2	6.3-6.4	6.5-6.7	6.8-7.0	7.1-7.4	7.5-7.8	7.9-8.0	8.1-8.2	8.3-8.4	8.5-8.8	8.9-9.3	9.4-10.2	10.3+
ARITHMETIC																	
REASONING.....	4.3	4.4-5.2	5.3-5.6	5.7-6.0	6.1-6.2	6.3-6.4	6.5-6.8	6.9-7.0	7.1-7.4	7.5-7.8	7.9-8.1	8.2-8.3	8.4-8.5	8.6-8.8	8.9-9.4	9.5-10.3	10.4+
ARITHMETIC																	
FUNDAMENTALS.....	4.2	4.3-5.3	5.4-5.7	5.8-6.0	6.1-6.2	6.3-6.4	6.5-6.8	6.9-7.0	7.1-7.4	7.5-7.7	7.8-7.9	8.0-8.2	8.3-8.4	8.5-8.7	8.8-9.2	9.3-10.0	10.1+
TOTAL																	
ARITHMETIC.....	4.2	4.3-5.2	5.3-5.6	5.7-6.0	6.1-6.2	6.3-6.4	6.5-6.8	6.9-7.0	7.1-7.4	7.5-7.7	7.8-8.0	8.1-8.2	8.3-8.4	8.5-8.7	8.8-9.3	9.4-10.2	10.3+
LANGUAGE																	
.....	4.2	4.3-5.1	5.2-5.6	5.7-5.9	6.0-6.1	6.2-6.3	6.4-6.7	6.8-7.0	7.1-7.5	7.6-7.9	8.0-8.1	8.2-8.4	8.5-8.6	8.7-9.0	9.1-9.7	9.8-10.9	11.0+
TOTAL TEST																	
.....	4.3	4.4-5.1	5.2-5.5	5.6-5.9	6.0-6.1	6.2-6.3	6.4-6.7	6.8-7.0	7.1-7.5	7.6-7.8	7.9-8.1	8.2-8.3	8.4-8.6	8.7-8.9	9.0-9.4	9.5-10.3	10.4+

# PERCENTILE NORMS FOR GRADE HIGH 7 (7.5-7.9)

A	1	5	10	15	20	25	40	50	60	70	75	75	80	85	90	95	99
B & C	1	5	10	15	20	25	30	40	50	60	70	75	80	85	90	95	99
READING																	
VOCABULARY.....	4.5	4.6-5.5	5.6-6.0	6.1-6.4	6.5-6.6	6.7-6.9	7.0-7.2	7.3-7.5	7.6-7.9	8.0-8.3	8.4-8.5	8.6-8.7	8.8-9.0	9.1-9.3	9.4-9.9	10.0-10.8	10.9+
READING																	
COMPREHENSION.....	4.8	4.9-5.6	5.7-6.0	6.1-6.4	6.5-6.6	6.7-6.9	7.0-7.2	7.3-7.5	7.6-7.9	8.0-8.3	8.4-8.5	8.6-8.7	8.8-8.9	9.0-9.2	9.3-9.7	9.8-10.5	10.6+
TOTAL																	
READING.....	4.6	4.7-5.5	5.6-6.0	6.1-6.4	6.5-6.6	6.7-6.9	7.0-7.2	7.3-7.5	7.6-7.9	8.0-8.3	8.4-8.5	8.6-8.7	8.8-8.9	9.0-9.2	9.3-9.8	9.9-10.7	10.8+
ARITHMETIC																	
REASONING.....	4.7	4.8-5.6	5.7-6.1	6.2-6.5	6.6-6.7	6.8-6.9	7.0-7.3	7.4-7.5	7.6-7.9	8.0-8.2	8.3-8.5	8.6-8.7	8.8-9.0	9.1-9.3	9.4-9.8	9.9-10.8	10.9+
ARITHMETIC																	
FUNDAMENTALS.....	4.5	4.6-5.5	5.6-6.2	6.3-6.5	6.6-6.7	6.8-6.9	7.0-7.3	7.4-7.5	7.6-7.9	8.0-8.2	8.3-8.5	8.6-8.7	8.8-9.0	9.1-9.2	9.3-9.7	9.8-10.5	10.6+
TOTAL																	
ARITHMETIC.....	4.6	4.7-5.5	5.6-6.1	6.2-6.5	6.6-6.7	6.8-6.9	7.0-7.3	7.4-7.5	7.6-7.9	8.0-8.2	8.3-8.5	8.6-8.7	8.8-9.0	9.1-9.3	9.4-9.8	9.9-10.7	10.8+
LANGUAGE																	
.....	4.5	4.6-5.3	5.4-5.9	6.0-6.2	6.3-6.5	6.6-6.9	7.0-7.3	7.3-7.5	7.6-7.9	8.0-8.3	8.4-8.6	8.7-8.9	9.0-9.2	9.3-9.6	9.7-10.2	10.3-11.4	11.5+
TOTAL TEST																	
.....	4.7	4.8-5.6	5.7-6.1	6.1-6.4	6.5-6.7	6.8-6.9	7.0-7.2	7.3-7.5	7.6-7.9	8.0-8.3	8.4-8.5	8.6-8.8	8.9-9.0	9.1-9.4	9.5-9.8	9.9-10.8	10.9+

# PERCENTILE NORMS FOR GRADE LOW 8 (8.0-8.4)

	A	1	5	10	15	20	25	40	50	60	70	75	75	80	85	90	95	99
	B & C	1	5	10	15	20	25	30	40	50	60	70	75	80	85	90	95	99
READING																		
VOCABULARY.....	4.8	4.9-5.5	5.6-6.2	6.3-6.6	6.7-7.1	7.2-7.3	7.4-7.7	7.8-8.0	8.1-8.4	8.5-8.7	8.8-9.0	9.1-9.2	9.3-9.5	9.6-9.8	9.9-10.4	10.5-11.5	11.6+	
COMPREHENSION...																		
READING.....	5.5	5.6-6.1	6.2-6.5	6.6-6.8	6.9-7.1	7.2-7.3	7.4-7.7	7.8-8.0	8.1-8.4	8.5-8.8	8.9-9.0	9.1-9.2	9.3-9.4	9.5-9.7	9.8-10.2	10.3-11.0	11.1+	
TOTAL																		
READING.....	5.0	5.1-6.0	6.1-6.4	6.5-6.7	6.8-7.1	7.2-7.3	7.4-7.7	7.8-8.0	8.1-8.4	8.5-8.7	8.8-9.0	9.1-9.2	9.3-9.5	9.6-9.8	9.9-10.3	10.4-11.3	11.4+	
ARITHMETIC																		
REASONING.....	5.0	5.1-5.9	6.0-6.7	6.8-6.9	7.0-7.2	7.3-7.4	7.5-7.7	7.8-8.0	8.1-8.4	8.5-8.8	8.9-9.0	9.1-9.2	9.3-9.5	9.6-9.8	9.9-10.3	10.4-11.3	11.4+	
ARITHMETIC																		
FUNDAMENTALS.....	4.7	4.8-5.8	5.9-6.6	6.7-6.9	7.0-7.2	7.3-7.4	7.5-7.6	7.7-8.0	8.1-8.4	8.5-8.8	8.9-9.0	9.1-9.2	9.3-9.5	9.6-9.8	9.9-10.2	10.3-11.1	11.2+	
TOTAL																		
ARITHMETIC.....	4.8	4.9-5.8	5.9-6.6	6.7-6.9	7.0-7.2	7.3-7.4	7.5-7.6	7.7-8.0	8.1-8.4	8.5-8.8	8.9-9.0	9.1-9.2	9.3-9.5	9.6-9.8	9.9-10.3	10.4-11.2	11.3+	
LANGUAGE.....	4.5	4.6-5.5	5.6-6.2	6.3-6.6	6.7-6.9	7.0-7.2	7.3-7.6	7.7-8.0	8.1-8.4	8.5-8.7	8.8-9.2	9.3-9.6	9.7-9.8	9.9-10.2	10.3-10.8	10.9-11.9	12.0+	
TOTAL TEST.....	5.0	5.1-5.8	5.9-6.4	6.5-6.8	6.9-7.0	7.1-7.3	7.4-7.7	7.8-8.0	8.1-8.4	8.5-8.8	8.9-9.1	9.2-9.3	9.4-9.6	9.7-9.9	10.0-10.4	10.5-11.3	11.4+	

# PERCENTILE NORMS FOR GRADE HIGH 8 (8.5-8.9)

	A	1	5	10	15	20	25	40	50	60	70	75	75	80	85	90	95	99
	B & C	1	5	10	15	20	25	30	40	50	60	70	75	80	85	90	95	99
READING																		
VOCABULARY.....	5.5	5.6-6.4	6.5-7.1	7.2-7.4	7.5-7.7	7.8-7.9	8.0-8.3	8.4-8.5	8.6-8.9	9.0-9.3	9.4-9.5	9.6-9.7	9.8-10.0	10.1-10.4	10.5-11.0	11.1-12.1	12.2+	
READING																		
COMPREHENSION.....	5.7	5.8-6.6	6.7-7.1	7.2-7.4	7.5-7.6	7.7-7.8	7.9-8.2	8.3-8.5	8.6-8.9	9.0-9.3	9.4-9.5	9.6-9.7	9.8-9.9	10.0-10.2	10.3-10.7	10.8-11.5	11.6+	
TOTAL																		
READING.....	5.6	5.7-6.5	6.6-7.1	7.2-7.4	7.5-7.7	7.8-7.9	8.0-8.2	8.3-8.5	8.6-8.9	9.0-9.3	9.4-9.5	9.6-9.7	9.8-9.9	10.0-10.3	10.4-10.9	11.0-11.9	12.0+	
ARITHMETIC																		
REASONING.....	5.4	5.5-6.4	6.5-7.1	7.2-7.4	7.5-7.6	7.7-7.9	8.0-8.3	8.4-8.5	8.6-8.9	9.0-9.3	9.4-9.5	9.6-9.8	9.9-10.1	10.2-10.4	10.5-10.9	11.0-12.0	12.1+	
ARITHMETIC																		
FUNDAMENTALS.....	5.4	5.5-6.6	6.7-7.1	7.2-7.4	7.5-7.6	7.7-7.9	7.9-8.2	8.3-8.5	8.6-8.9	9.0-9.3	9.4-9.5	9.6-9.7	9.8-10.0	10.1-10.3	10.4-10.8	10.9-11.6	11.7+	
TOTAL																		
ARITHMETIC.....	5.4	5.5-6.5	6.6-7.1	7.2-7.4	7.5-7.6	7.7-7.9	8.0-8.3	8.4-8.5	8.6-8.9	9.0-9.3	9.4-9.5	9.6-9.8	9.9-10.1	10.2-10.4	10.5-10.9	11.0-11.9	12.0+	
LANGUAGE.....	5.2	5.3-6.3	6.4-6.7	6.8-7.1	7.2-7.4	7.5-7.6	7.7-8.1	8.2-8.5	8.6-9.0	9.1-9.5	9.6-9.8	9.9-10.1	10.2-10.4	10.5-10.8	10.9-11.4	11.5-12.4	12.5+	
TOTAL TEST.....	5.4	5.5-6.5	6.6-7.0	7.1-7.3	7.4-7.5	7.8-7.9	8.0-8.2	8.3-8.5	8.6-9.0	9.1-9.4	9.5-9.6	9.7-9.9	10.0-10.2	10.3-10.5	10.6-11.0	11.1-11.9	12.0+	

# PERCENTILE NORMS FOR GRADE LOW 9 (9.0-9.4)

	A	1	5	10	15	20	25	40	50	60	70	75	75	80	85	90	95	99
	B & C	1	5	10	15	20	25	30	40	50	60	70	75	80	85	90	95	99
READING VOCABULARY.....	5.7	5.8-6.9	7.0-7.6	7.7-7.9	8.0-8.2	8.3-8.4	8.5-8.7	8.8-9.0	9.1-9.4	9.5-9.8	9.9-10.0	10.1-10.3	10.4-10.6	10.7-10.9	11.0-11.5	11.6-12.6	12.7+	
READING COMPREHENSION....	6.2	6.3-7.2	7.3-7.6	7.7-7.9	8.0-8.1	8.2-8.3	8.4-8.7	8.8-9.0	9.1-9.4	9.5-9.8	9.9-10.0	10.1-10.2	10.3-10.5	10.6-10.8	10.9-11.2	11.3-12.1	12.2+	
TOTAL READING.....	6.0	6.1-7.0	7.1-7.6	7.7-7.9	8.0-8.1	8.2-8.3	8.4-8.7	8.8-9.0	9.1-9.4	9.5-9.8	9.9-10.0	10.1-10.3	10.4-10.6	10.7-10.9	11.0-11.4	11.5-12.4	12.5+	
ARITHMETIC REASONING.....	6.0	6.1-7.0	7.1-7.6	7.7-7.9	8.0-8.1	8.2-8.3	8.4-8.7	8.8-9.0	9.1-9.4	9.5-9.8	9.9-10.0	10.1-10.3	10.4-10.6	10.7-10.9	11.0-11.5	11.6-12.7	12.8+	
ARITHMETIC FUNDAMENTALS....	5.5	5.6-6.9	7.0-7.6	7.7-7.9	8.0-8.2	8.3-8.4	8.5-8.8	8.9-9.0	9.1-9.5	9.6-9.8	9.9-10.0	10.1-10.2	10.3-10.5	10.6-10.8	10.9-11.2	11.3-12.1	12.2+	
TOTAL ARITHMETIC.....	5.7	5.8-7.0	7.1-7.6	7.7-7.9	8.0-8.1	8.2-8.3	8.4-8.7	8.8-9.0	9.1-9.4	9.5-9.8	9.9-10.0	10.1-10.3	10.4-10.6	10.7-10.9	11.0-11.4	11.5-12.4	12.5+	
LANGUAGE.....	5.4	5.5-6.4	6.5-7.2	7.3-7.5	7.6-7.8	7.9-8.1	8.2-8.6	8.7-8.9	9.0-9.5	9.6-10.0	10.1-10.3	10.4-10.6	10.7-10.9	11.0-11.3	11.4-11.9	12.0-13.0	13.1+	
TOTAL TEST.....	5.8	5.9-6.9	7.0-7.5	7.6-7.8	7.9-8.1	8.2-8.3	8.4-8.7	8.8-9.0	9.1-9.5	9.6-9.9	10.0-10.1	10.2-10.4	10.5-10.7	10.8-11.0	11.1-11.5	11.6-12.5	12.6+	

# PERCENTILE NORMS FOR GRADE HIGH 9 (9.5-9.9)

	A	1	5	10	15	20	25	40	50	60	70	75	75	80	85	90	95	99
	B & C	1	5	10	15	20	25	30	40	50	60	70	75	80	85	90	95	99
READING VOCABULARY.....	6.5	6.6-7.6	7.7-8.1	8.2-8.4	8.5-8.7	8.8-8.9	9.0-9.3	9.4-9.5	9.6-9.9	10.0-10.3	10.4-10.6	10.7-10.8	10.9-11.1	11.2-11.5	11.6-12.1	12.2-13.2	13.3+	
READING COMPREHENSION....	6.8	6.9-7.6	7.7-8.1	8.2-8.4	8.5-8.6	8.7-8.8	8.9-9.2	9.3-9.5	9.6-9.9	10.0-10.3	10.4-10.5	10.6-10.8	10.9-11.0	11.1-11.3	11.4-11.8	11.9-12.7	12.8+	
TOTAL READING.....	6.6	6.7-7.6	7.7-8.1	8.2-8.4	8.5-8.7	8.8-8.9	9.0-9.2	9.3-9.5	9.6-9.9	10.0-10.3	10.4-10.6	10.7-10.8	10.9-11.1	11.2-11.4	11.5-12.0	12.1-13.0	13.1+	
ARITHMETIC REASONING.....	6.2	6.3-7.4	7.5-8.0	8.1-8.3	8.4-8.6	8.7-8.8	8.9-9.2	9.3-9.5	9.6-9.9	10.0-10.3	10.4-10.6	10.7-10.8	10.9-11.2	11.3-11.6	11.7-12.2	12.3-13.4	13.5+	
ARITHMETIC FUNDAMENTALS....	5.8	5.9-7.2	7.3-8.0	8.1-8.4	8.5-8.6	8.7-8.9	9.0-9.3	9.4-9.5	9.6-9.9	10.0-10.3	10.4-10.5	10.6-10.7	10.8-10.9	11.0-11.2	11.3-11.7	11.8-12.6	12.7+	
TOTAL ARITHMETIC.....	6.0	6.1-7.3	7.4-8.0	8.1-8.3	8.4-8.6	8.7-8.9	9.0-9.2	9.3-9.5	9.6-9.9	10.0-10.3	10.4-10.6	10.7-10.8	10.9-11.1	11.2-11.4	11.5-12.0	12.0-12.9	13.0+	
LANGUAGE.....	5.5	5.6-7.1	7.2-7.7	7.8-8.1	8.2-8.4	8.5-8.7	8.8-9.2	9.3-9.5	9.6-9.9	10.0-10.4	10.5-10.8	10.9-11.1	11.2-11.5	11.6-11.9	12.0-12.5	12.6-13.6	13.7+	
TOTAL TEST.....	6.2	6.3-7.5	7.6-8.0	8.1-8.3	8.4-8.5	8.6-8.8	8.9-9.2	9.3-9.5	9.6-9.9	10.0-10.4	10.5-10.7	10.8-10.9	11.0-11.3	11.4-11.7	11.8-12.2	12.3-13.2	13.3+	

# INTERMEDIATE NORMS (1943)

(Continued from page 20.)

Grade Placement	Reading Vocabulary	Reading Comprehension	Total Reading	Arithmetic Reasoning	Arithmetic Fundamentals	Total Arithmetic	Language	Total Score	Grade Placement	Age in Months
9.5	70	....	111	37	70	106-107	85	300-303	9.5	178
9.6	71	42	112	....	71	108	86	304-306	9.6	179
9.7	72	....	113	38	....	109	87	307-309	9.7	180
9.8	73	43	114	....	72	110-111	88	310-313	9.8	181
9.9	74	....	115-116	39	73	112	89	314-317	9.9	182
10.0	75	44	117-118	....	....	113	90	318-321	10.0	183
10.1	76	....	119	40	74	114	91	322-324	10.1	184-5
10.2	77	45	120	41	....	115	92	325-327	10.2	186
10.3	78	....	121-122	42	75	116	93	328-331	10.3	187
10.4	79	46	123	....	....	117	94	332-334	10.4	188
10.5	80	47	124-125	43	....	118	95	335-338	10.5	189
10.6	81	....	126	44	76	119	96	339-341	10.6	190
10.7	82	48	127-128	....	....	120	97	342-345	10.7	191
10.8	....	....	129	45	77	121	98	346-348	10.8	192
10.9	83	49	130	46	....	122	99	349-351	10.9	193-4
11.0	84-85	50	131-135	47	78	123-126	100-101	352-360	11.0	195
11.5	86	....	136-137	48	79	127-128	102-103	361-368	11.5	200
12.0	87	51	138-139	49	80	129	104	369-372	12.0	206
12.5	88	....	140	50	....	130	105	373-375	12.5	212
13.0	89	52	141	51	....	131	106	376-378	13.0	219
13.5	....	53	142	52	....	132	107	379-381	13.5	226
14.0	90	54	143	53	....	133	108	382-384	14.0	231
14.5	....	....	144	54	....	134	109	385-387	14.5	236
15.0	....	55	145	55	....	135	110	388-390	15.0	241

Examiner's Notes

# X. GRADE PLACEMENT AND AGE NORMS—INTERMEDIATE BATTERY (1943 REVISION)

Grade Placement	Reading Vocabulary	Reading Comprehension	Total Reading	Arithmetic Reasoning	Arithmetic Fundamentals	Total Arithmetic	Language	Total Score	Grade Placement	Age in Months*
3.0	1	---	1	---	1	1	1	1- 3	3.0	101
3.1	2	1	2- 3	---	---	---	2- 4	4- 9	3.1	102
3.2	3	2	4- 5	---	---	---	5- 7	10- 15	3.2	103-4
3.3	4	3	6- 7	---	2	2	8-10	16- 24	3.3	105
3.4	5	4	8- 9	---	---	3	11-13	25- 28	3.4	106
3.5	6	---	10	1	3	4	14-15	29- 32	3.5	107
3.6	7	5	11- 12	---	---	---	16-17	33- 36	3.6	108
3.7	---	6	13	---	---	5	18-19	37- 40	3.7	109
3.8	8	7	14- 15	---	4	---	20-21	41- 43	3.8	110-1
3.9	9	8	16- 17	---	---	6	22	44- 47	3.9	112
4.0	10	9	18- 19	2	5	7	23-24	48- 51	4.0	113
4.1	11-12	10	20- 22	---	6- 7	8- 9	25-26	52- 57	4.1	114
4.2	13	11	23- 24	---	8- 9	10- 11	27	58- 62	4.2	115-6
4.3	14-15	---	25- 26	3	10	12- 13	28-29	63- 68	4.3	117
4.4	16	12	27- 28	---	11-12	14- 15	30	69- 73	4.4	118
4.5	17-18	13	29- 31	---	13	16- 17	31-32	74- 80	4.5	119
4.6	19	14	32- 33	4	14-15	18- 19	33	81- 85	4.6	120-1
4.7	20-21	15	34- 36	---	16	20- 21	34-35	86- 92	4.7	122
4.8	22-23	16	37- 39	5	17-18	22- 23	36	93- 98	4.8	123-4
4.9	24	17	40- 41	---	19	24- 25	37	99-103	4.9	125
5.0	25	18	42- 43	6	20	26- 27	38	104-108	5.0	126
5.1	26-27	---	44- 45	7	21-22	28- 29	39	109-113	5.1	127
5.2	28-29	19	46- 48	8	23-24	30- 31	40	114-119	5.2	128-9
5.3	30	---	49- 50	9	25	32- 34	41	120-125	5.3	130
5.4	31-32	20	51- 52	---	26-27	35- 36	42-43	126-130	5.4	131
5.5	33	---	53	10-11	28-29	37- 38	44	131-135	5.5	132
5.6	34	21	54- 55	12	30	39- 40	45	136-140	5.6	133-4
5.7	35	---	56	---	31	41- 42	46	141-144	5.7	135
5.8	36	22	57- 58	13	32-33	43- 45	47	145-150	5.8	136-7
5.9	37	23	59- 60	---	34	46- 47	48-49	151-156	5.9	138
6.0	38	---	61	14	35-36	48- 50	50	157-161	6.0	139
6.1	39	24	62- 63	---	37-38	51- 52	51	162-166	6.1	140-1
6.2	40	---	64	15	39	53	52-53	167-170	6.2	142
6.3	41	25	65- 66	---	40	54- 55	54	171-175	6.3	143
6.4	42	26	67- 68	16	41	56- 57	55	176-180	6.4	144
6.5	43	---	69	17	42	58- 59	56	181-185	6.5	145
6.6	44	27	70- 71	18	43-44	60- 62	57	186-190	6.6	146-7
6.7	45	28	72- 73	---	45	63- 64	58	191-195	6.7	148
6.8	46	---	74	19	46	65- 66	59	196-199	6.8	149
6.9	47	29	75- 76	20	47	67	60	200-203	6.9	150-1
7.0	48	30	77- 78	---	48	68- 69	61	204-208	7.0	152
7.1	49	---	79	21	49	70	62	209-212	7.1	153
7.2	50	31	80- 81	---	50	71- 72	63	213-216	7.2	154
7.3	51	---	82	22	51	73	64	217-220	7.3	155
7.4	52	32	83- 84	23	52	74- 75	65	221-224	7.4	156
7.5	53	33	85- 86	---	53	76	66	225-228	7.5	157
7.6	54	---	87	24	54	77- 78	67	229-232	7.6	158
7.7	55	34	88- 89	25	---	79	68	233-236	7.7	159
7.8	56	---	90	---	55	80	69	237-240	7.8	160
7.9	57	35	91- 92	26	56	81- 82	70	241-244	7.9	161
8.0	58	---	93	27	57	83- 84	71	245-248	8.0	162
8.1	59	36	94- 95	---	58	85	72	249-252	8.1	163
8.2	60	---	96	28	59	86- 87	73	253-256	8.2	164
8.3	61	---	97	29	60	88- 89	74	257-260	8.3	165
8.4	---	37	98	30	61	90	75	261-263	8.4	166
8.5	62	---	99	---	62	91- 92	---	264-266	8.5	167
8.6	63	---	100	31	63	93	76	267-269	8.6	168
8.7	---	38	101	---	---	94	77	270-272	8.7	169
8.8	64	---	102	32	64	95- 96	78	273-276	8.8	170-1
8.9	65	39	103-104	33	65	97	79	277-280	8.9	172
9.0	66	---	105	34	66	98- 99	80	281-284	9.0	173
9.1	---	40	106	35	67	100	81	285-287	9.1	174
9.2	67	---	107	---	---	101-102	82	288-291	9.2	175
9.3	68	---	108	36	68	103	83	292-295	9.3	176
9.4	69	41	109-110	---	69	104-105	84	296-299	9.4	177

FOR HIGHER SCORES, SEE NORMS (Cont.) ON PAGE 19.

Note: For separate SPELLING Norms, see page 5.

\* Subject, educational, or chronological age equivalent to grade placement.

sight, and provide remedial exercises for improvement.

**Conclusion.** The Analysis of Learning Difficulties appearing in or on each test booklet is designed to provide a check list of the most important elements in the mastery of the basic skills. The teacher may thus fit instruction to the particular needs of the pupils.

## VI. RELIABILITY

The coefficients of reliability of the tests which have been computed on the basis of a correlation of scores for Form A with Form B for a two-grade range are given below:

Reading Vocabulary	-	-	-	-	-	.915
Reading Comprehension	-	-	-	-	-	.893
Arithmetic Reasoning	-	-	-	-	-	.930
Arithmetic Fundamentals	-	-	-	-	-	.952
Language	-	-	-	-	-	.954
Total Score	-	-	-	-	-	.974

Because of the limited number of items (10 to 30) the nineteen sub-scores should be regarded as indicative of difficulty areas only; they are useful primarily in identifying points at which careful study of specific responses should be made and in differentiating the profile which otherwise would consist of but five points.

## VII. VALIDITY

These standardized achievement tests possess a high degree of validity. The content is based on some of the most tangible and most easily identified objectives of the curriculum, hence the selection of items on which validity depends is simplified. Whereas curricula and curricular objectives in science or social studies may differ widely in different geographical areas, the fundamental skills or tools of learning are relatively similar and universal.

The fact that a particular community consciously or inadvertently develops a course of study in these learning skills significantly out of line with relatively general practice does not reduce the validity of this test; the test still measures the mastery of these skills in terms of the grade placements or percentiles achieved by the population used in validating this test. However, such a situation would require a more careful interpretation of the scores obtained by the particular community involved.

The selection of the items of the original edition was based on careful study of the curriculum objectives of the progressive city and state courses of study. The tests were tried out in widely separated geographical areas in the United States. The 1937 Edition was based on tests given to over 100,000 pupils in schools similarly located. The 1943 Edition is also based on recent and extensive data.

Many studies have been made of individual items under a variety of conditions; with few exceptions

the value of such items has been vindicated and they have been retained. A few items have been dropped and new items validated.

A number of studies have been made of the reliability of differences between succeeding grade medians. The Educational Records Bureau has published a report indicating that regardless of the test used where batteries overlap, these achievement tests produce approximately the same grade placements for the same students.

## VIII. NORMS

1. **Meaning.** There has been much misunderstanding and misuse of norms in the past. Norms should not be regarded as rigid standards to be attained by all school groups under all circumstances. Instead, they should be regarded as relatively stable points of reference to be used in interpreting the results of testing in a particular school or community.

Norms are but the *typical* performance of large unselected groups of similar children on test items which have been carefully selected and validated, and which represent general practice with respect to these specific objectives of the school curriculum. When the obtained scores of a testing program of a particular school or community depart significantly (above or below) from the test norms, it means simply that these scores are above or below the average scores of large unselected groups of similar children. Such results do not necessarily indicate superior or inferior school work. The testing program merely reveals the facts without interpreting them; interpretation is the function and responsibility of the examiner.<sup>1</sup>

Differences in courses of study, materials of instruction, time allotments, and conscious emphasis on certain skill areas, as well as differences in the quality of teaching and the intelligence of pupils are among the factors which may account for deviations from test norms. Test norms should serve as the point of departure both in investigating the reasons for the obtained results and in determining the desirability of possible modifications of the factors which account for the obtained results.

2. **Grade placement norms.**<sup>2</sup> In using the grade placement norms the examiner simply locates the particular score (for each of the five skill areas separately, or for the test as a whole) she wishes to transpose and then notes the corresponding number in the grade placement column. Thus if opposite a score of 62 in Reading Vocabulary the examiner finds a 8.5 in the grade placement column, it means reading vocabulary ability equal to the average of pupils who have been five months in the eighth grade. If the examiner finds opposite 181-185 in the total score column a

<sup>1</sup> In this connection, the table on page 11 will be helpful.

<sup>2</sup> See pages 19 and 20.

6.5 in the grade placement column, it means ability in the learning skills equal to that possessed by the average of those who have been five months in the sixth grade. The grade placement equivalents of obtained scores may also be read directly from the grade placement scales placed at the top and bottom of the diagnostic profiles on the first page of each test booklet.

3. Percentile norms.<sup>3</sup> In using the percentile norms, the examiner first locates the test section

(reading vocabulary, language, etc.) in which he is interested. To the right of this section, he locates the score which he wishes to transpose. Directly above and below this score (at the top and bottom of the norm table) will be found the corresponding percentile. A percentile of 25 signifies that this pupil surpasses 25 per cent and is surpassed by 75 per cent of similar pupils in this ability or group of abilities.

<sup>3</sup> See pp. 15-18.

## Examiner's Notes